

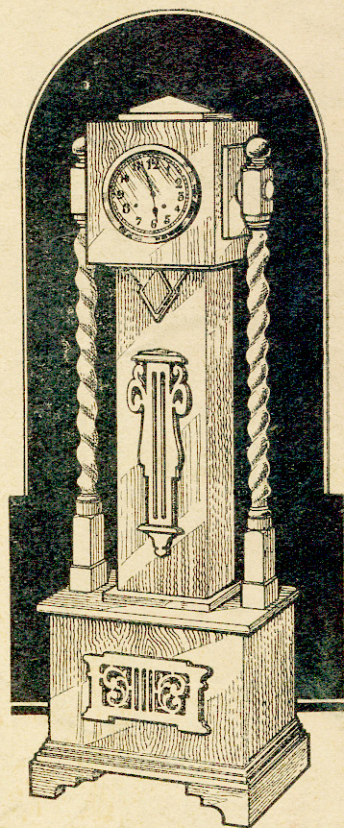
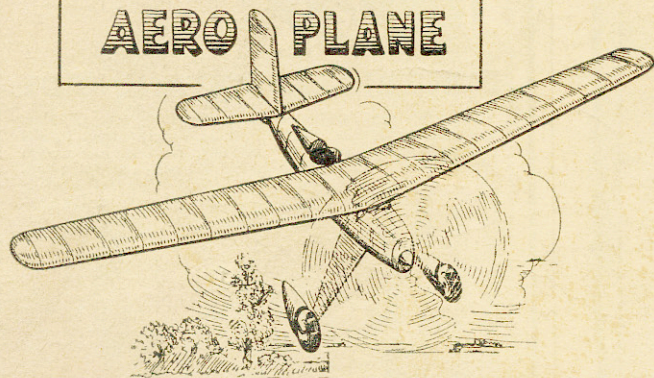
SPECIAL ENLARGED NUMBER

Hobbies

WEEKLY

**LARGE FREE DESIGN
FOR THIS
GRANDMOTHER
CLOCK**

**BLUE-PRINT SUPPLIED FOR
FLYING MODEL
AERO PLANE**



March 26th. 1938

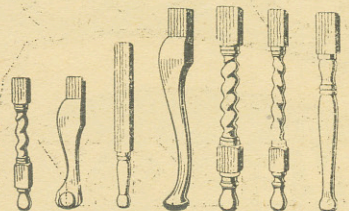
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Vol. 85. No. 2214

**THE FRETWORKER'S AND
HOME CRAFTSMAN'S JOURNAL**

Bargains in Turned Legs

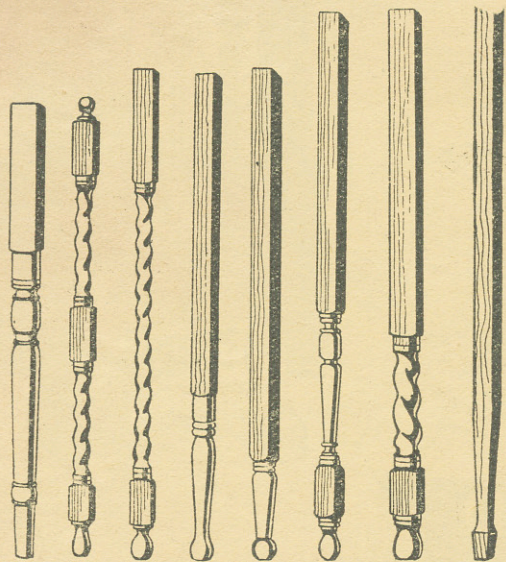
Save 3d. in the 1/- on Turned Legs! Exactly as listed in Hobbies 1938 Hand-book. Don't delay... the Sale ends April 2nd., so get your order in the post NOW. Hobbies Ltd., Dereham, Norfolk.



507	514	520	513	505	508	509
No. 505	Oak	3/-	No. 513 from 6			
No. 506	"	2/9	to 18 ins. long.			
No. 507	"	2/3	at 25% reduction			
No. 509	Beech	2/4				
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Per set of 4 Post 6d.

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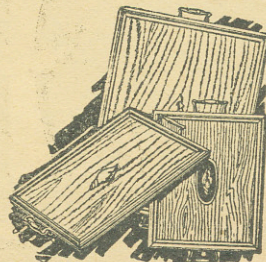


No. 510	36 ins. x 2 ins.	No. 517	36 ins. x 1 1/2 ins.
Oak	4/10 1/2	Beech	2/7 1/2
No. 503	30 ins. x 1 1/2 ins.	No. 518A	30 ins. x 1 1/2 ins.
Oak	4/6	Beech	1/10 1/2
No. 504	30 ins. x 1 1/2 ins.	No. 519B	36 ins. x 1 1/2 ins.
Oak	4/10 1/2	Beech	2/3
No. 508	30 ins. x 1 1/2 ins.	No. 523B	30 ins. x 1 1/2 ins.
Oak	2/3	Oak	3/-
No. 510	28 ins. x 2 ins.		
Deal	2/7 1/2		

Per set of 4. Post 9d.

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Bargains
for the
Handyman



Hobbies Once-a-Year Sale provides a definite opportunity for the home handyman to save money on his everyday requirements.

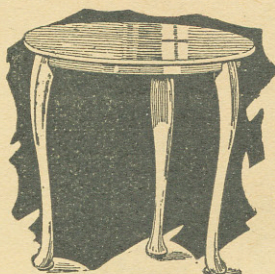
Imagine, for only 1/8 you can now buy the materials for making a mahogany tray!

Sale ends April 2nd

TRAY PARCELS

Containing baseboard, moulding handles and transfer. In three sizes: 14 1/2 by 11 1/2 ins., 1/8; 19 by 11 1/2 ins., 1/10 1/2; 20 by 15 ins., 2/-. Postage 6d. on each.

Send for Free List of Sale Bargains.

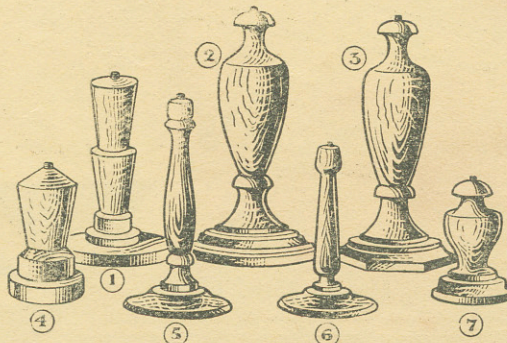


A COFFEE TABLE for 6/-

If you saw this Table in a shop priced at a guinea you would think it good value. You can make it yourself for 6/- (post 1/-). It is 18 ins. high with 18 in. top. You simply glue and screw the parts together. Usual Price 9/-

ELECTRIC LAMP STANDARDS

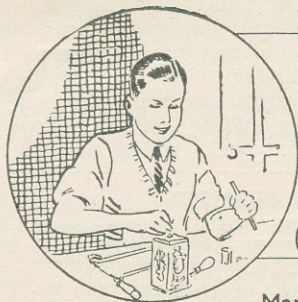
You have often admired those pretty table lamps. Now you can make your own! Hobbies supply nicely turned standards drilled ready for the flex, from as low as 7d. Wire Frame for shade, shade paper and switch also supplied.



No. 1.	Beech, 9 ins. tall.	2/3	No. 4.	Beech, 6 ins. tall.	2/3
No. 2.	Beech, 10 1/2 ins. tall.	2/3	No. 5.	Oak, 10 ins. tall.	1/-
No. 3.	Oak (weighted base), 10 1/2 ins. tall.	2/9	No. 6.	Beech, 8 ins. tall.	7d.
			No. 7.	Beech, 5 1/2 ins. tall.	1/5

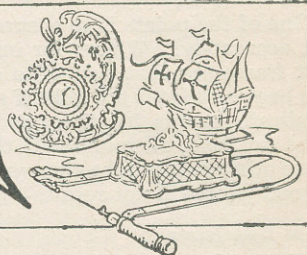
Postage is extra to all prices

Hobbies Ltd., Dereham and Branches



Hobbies

WEEKLY



March 26th. 1938

Vol. 85. No. 2214

ELECTRIC OR 8-DAY CLOCK

WE illustrate here one of the most striking Clock Designs we have yet published, and one which we know will appeal very strongly to readers. It may be they are not able to make it up at the moment, but we would strongly recommend them to do so because it is the sort of thing which proves the use of the fretsaw as worth while.

It is actually a piece of furniture which can take pride of place in any home, and is suitable either for any room or the hall, whilst not being so large as a grandfather, it is the type of the grandmother clock, but with a more imposing base and imitation suspension for the clock movement itself.

It is quite modern, too, because we have arranged for it to incorporate an electric clock suitable for any A.C. mains, working on a voltage of 200 to 250.

On the other hand, if you do not require the electric clock, supply is also arranged for an ordinary striking 8-day movement.

Complete for 35/-

As is usual with the gift design of the week, a supply of the necessary wood and minor fittings places the making of the whole article within the range of everyone. The whole clock, for instance, can be completed for 35/- with an ordinary clock, or 39/- if the electric model is desired.

A point to remember, too, is that the wood provided is nicely grained and finished spanish chestnut so that the ordinary person would imagine that the whole clock was completed in solid oak.

Moreover, the two spindles

which appear to support the clock movement are really novelty Jacobean turned legs. This cuts out any further trouble in that respect, for they are just fitted to the sides when ready.

Lettered Parts

Further to help the constructor, the pieces of wood in the parcel are lettered in a similar manner to the patterns on the design sheet, so construction is straightforward. There is not a great deal of cutting actually to be done, and all of it can be undertaken with a comparatively small fretsaw.

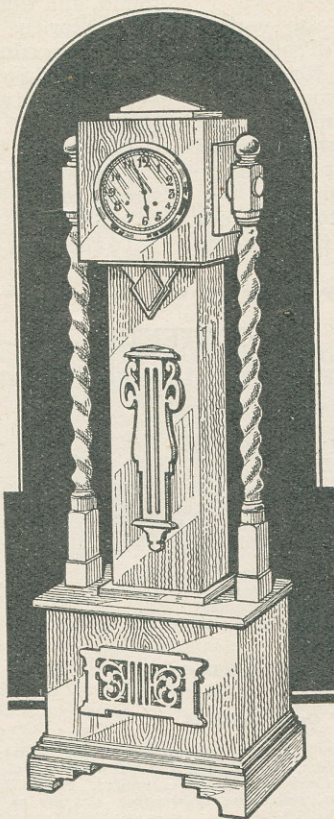
This is possible because the clock is made up actually in three independent portions, as the following details and the drawings herewith show. When completed, however, this imposing clock stands 3ft. 8½ins. high and is 15ins. wide on the base.

If you have a few fretwork tools and a little experience of cutting out, you can complete the article quite easily. The actual construction is straightforward plain box formations being used to keep the three independent parts alike. Those who have done any amateur carpentry, therefore, will understand quite clearly from the design, how to go ahead with the construction.

Full Patterns

The various patterns are shown full size, although in one or two cases it has been impossible to put them out in full. The broken patterns, however, can be easily extended to the dimensions shown.

In many cases, too, it will not be necessary to paste the pattern



down to the wood, if the paper is laid over the board a hole can be pricked in the corners exactly, then these holes linked up on the wood with pencil lines.

One of the points is to ensure that the parts are cut accurately. Where, for instance, you have a box frame see that two sides are alike, and that the back and front are alike if so required. Stand duplicate boards together, and notice that their sides are flush all round. If this is not the case, some other part will be thrown out of position and a good joint will not result.

Plain Butt Joints

All the framework is made up with plain butt joints. That is, the edge of one side stands up to the face of another. In consequence, it is very essential to get the edges flat and true. Be careful, therefore, to cut along the line provided and afterwards true it up with square or steel ruler.

The wood concerned for the various parts is in no case thicker than $\frac{3}{4}$ in. and most of it is $\frac{1}{4}$ in. material. As provided by Hobbies, too, it is planed and cut the sizes for the various pieces concerned, so that work is reduced to a minimum.

Where possible allow the edges of the actual piece because they are usually machined square and so save further trouble. Study the drawings herewith in conjunction with the parts on the sheet, and get an idea of the construction as a whole, before commencing work.

Notice Positions

The patterns on the sheet have also various dotted lines showing the position of adjoining pieces, and it is essential to realise where these come and to make some mark on the wood.

For instance, the bottom box frame does not stand exactly central on the base, but the dotted lines shown on the pattern for floor A indicate exactly where the whole thing comes.

This part, indeed, is the first to have our attention in construction, and in this we are assuming that the parts are cut, cleaned and marked out all ready.

Take the floor A as a foundation, and build upon it the upright pieces A, B, C and D. The two sides (C) stand behind the front (B) and the plywood back (D) comes between them. It is best to have some in. square deal in strips in order to cut off odd lengths of 2 or 3 ins. to form strengthening blocks which can be put inside the angles to stiffen the whole thing up. A cut-away view of this lower box is given at Fig. 1.

Notice that a strip of deal is put behind the back along each side because this part is screwed on to these strips and not glued in. It should, however, be fitted now and the top of the box also put on. A thin overlay can be cut and glued to the front or left until later.

In the angle of the upright pieces and the base is fitted the decorative moulding No. 21. Three pieces are required. The back end of the side

MATERIAL SUPPLIED

Wood.—For making this Clockcase we supply a parcel of selected Spanish Chestnut and plywood including two (No. 503) turned twist legs and sufficient (No. 21) Moulding for the base.—13/- (post free 14/-).

Fittings.—A reliable striking 8-day clock (No. 5512) 21/- or an electric clock 200/250 volts. (No. 5514) 25/- Door catch (No. 5482) 4d. and a pair of fancy Hinges (No. 5379) 2d., two 2in. screws, 1d. Postage on fittings with clock 6d.

A complete parcel wood and fittings with striking clock, 35/- carriage paid.

A complete parcel with electric clock, 39/- carriage paid.

pieces is square, but the front end is mitred off to make a good angle with the larger piece. The moulding stands on the base with its wider surface on the upright sides.

Raising this base we have strip feet $\frac{3}{4}$ in. thick and 1 $\frac{1}{2}$ ins. wide. The back and two side portions are plain pieces of wood. The front ones are short strips with fancy ends. To make the appearance of a further member, these feet portions are glued with a slight projection beyond the actual base. There is about $\frac{1}{4}$ in. all the way round, and this can be seen also in Fig. 1.

Now for the centre member which is the narrow tall box portion 6 ins. wide and 3 $\frac{1}{2}$ ins. from back to front. Like the other pieces it is made up in box form between a top and bottom which are glued on.

Here again the sides go behind the front, and the plywood comes between at the back, whilst strengthening blocks are added all the way round to stiffen up.

To the front of this piece also, there are overlays

to add. The long overlay in the centre is a piece of $\frac{1}{4}$ in. material glued on, then above it is a little shaped cornice. Above this in turn, and standing a little way away from the face of the clockcase, is the $\frac{1}{4}$ in. pediment glued to the top of themoulded portion.

A similarly rounded part is fitted in towards the lower end of the overlay. A detail of the fitting of this piece is shown at Fig. 2.

The Clock Case

For the clockcase itself, we have another complete box, but here the top and bottom do

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not overlap. These two pieces are glued between the sides, whilst a front is complete to cover up the edges of all. The back, on the other hand, fits inside and all the corners are strengthened up as much as possible by lengths of gluing blocks. Notice that the back is cut from plywood and from the centre of it is cut out a door. This, in turn, is provided with a pair of hinges and a catch, and is prevented from going inwards by a little piece of wood glued on inside the back to act as a stop.

A cut-away view of this portion also is shown at Fig. 3 and in this, too, can be seen the ornamental portions on the side and the top. These

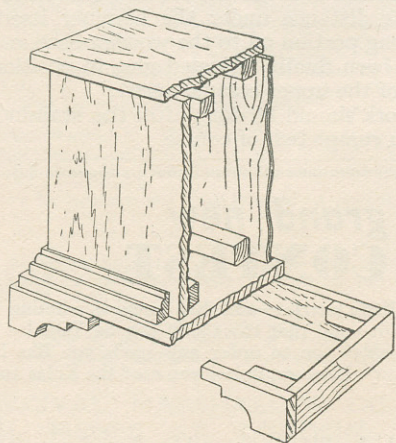


Fig. 1—The lowest case in broken section

ornamental portions are plain rectangles of wood glued to the centre of each of the parts concerned. On the top we have a little upright pediment glued $\frac{3}{8}$ in. back.

The Three Cases

We have thus far completed the three actual boxes. In every case the back has been only temporarily fitted, because we shall now require them out to allow us to put the three box frames together.

Get the long narrow column—the second box—central on to the top of the lower one. Mark its position, glue it in place, and before the glue has set drive some screws upwards from inside. Three or four screws should be used.

The uppermost box is glued and screwed in the same way to the top of the narrow centre portion, then the whole thing should be quite rigid.

There yet remains to fit and fix the inverted Jacobean twist legs at each side. Their actual length should be 2ft. 5½ ins. and both should be cut to this if any trimming is required.

Stand these legs upside down on the lower base, so that the short square section below the top ball comes level with the plain rectangle of wood on the sides. These legs are held away from the side by a $\frac{3}{8}$ in. disc 1 in. in diam. Cut these two discs and note their position temporarily opposite the side of the leg.

Fixing the Leg

Now we must bore a hole right through the leg through the disc and into the solid side of the

clockcase. A long thin screw should be used, and it must be at least 2 ins. long, as supplied in the parcel.

In order to prevent splitting the wood, however, bore a hole for it with a brace and suitable bit, and remember to countersink to allow the head to be at least flush with the face of the leg.

Glue the parts also, of course, then finally drive the screw home and cover the head with one of the other 1 in. diam. discs provided.

A detail of the fitting of this leg is shown at Fig. 4 where a sectional drawing is also shown of the screw passing into the side. The opposite end of the leg—the square portion—rests firmly on the floor portion, and is there glued in place.

A Bottom Collar

A screw should also be added from inside upwards. Make a hole in the end of the leg before putting it on, in order to give the screw a start. If possible, add two screws to make the whole thing rigid.

To prevent a "spindle" appearance to this end of the leg, a little collar formation is produced by the addition of four little pieces of $\frac{1}{4}$ in. rectangles. Of these, the two sides are put between the back and front so that the joint cannot be seen in an ordinary way.

The clock is now finished, and it is a matter of individual taste whether the wood is left in its natural shade or coloured down. Here you have the option of oiling to

get a dull polished surface, or staining and polishing to get a brighter gloss.

Or, of course, you can stain an ordinary Jacobean oak shade, then apply a wax polish. The stain can be applied to the whole thing with a brush, but be sure to get an even shade.

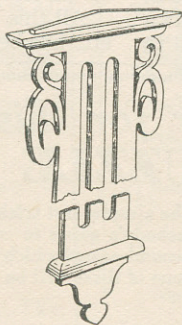


Fig. 2—The front ornament

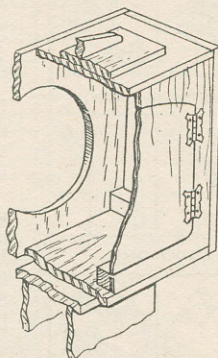


Fig. 3—The clock compartment

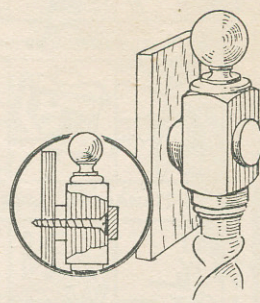


Fig. 4—How the leg is fixed at the top

If you have not attempted polishing before, we should not recommend doing this in the case of the various overlays and the twist legs.

Some may be satisfied with a light clear varnish and this must be applied in a warm room to prevent streakiness appearing on the surface.

The fitting of the electric clock movement, is quite straightforward. Put the works in from the front, then bend back the three lugs which have little holes in them, screwing them or nailing them

down to little $\frac{1}{4}$ in. thick pieces of wood which should be glued to the front. The flex is carried out through a hole made in the back, then the plug rewired on to it.

In the case of the ordinary fitting, the procedure is a little different.

The hands, of course, are taken off the front and the movement itself put through from behind. The clock face

itself is added on the front and the hands replaced in position. The main point is to

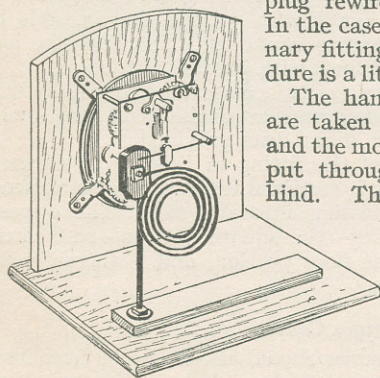


Fig. 5—The clock movement with striker

obtain a correct fitting of the gong or spring portion which is an independent piece. The detail at Fig. 5 shows this clearly.

Fitting the Gong

The gong spring movement is fitted to a support piece $1\frac{1}{2}$ ins. wide and 8 ins. long. At one end a small hole is drilled for the rod which has to hold the spring movement upright, and the washer and nut are added to form the base. The flat piece of the spring must rest immediately below the strike on the steel movement. It is merely a matter of adjustment of the two nuts on the support piece to raise or lower the striking movement to a suitable distance under the hammer itself.

Get the gong portion on to the wooden base and when it has been finally adjusted glue in position to the floor of the upper compartment.

All this work should be done after the staining, etc. has been completed, of course.

You must enter for this grand new PICTURE PUZZLE CONTEST

A BIG four-week contest! You'll like working out the simple, but tricky little puzzles—and then imagine winning a brand new A1 Fretmachine! It MUST be won—somebody's going to win it—and that somebody can be YOU!

But, should you just miss the mark, there's a fine Second award which enables you to order any goods you like in Hobbies Handbook from Hobbies, Ltd. up to 17/6. None of these will be yours, however, unless you read the Rules and Conditions carefully and abide by them.

WHAT YOU HAVE TO DO.

To enter this Competition, you have merely to collect the coupons which will appear each week and complete them in ink according to the clue sentences and your own common sense.

To get the answers to the clue sentences, study the pictures and pencil down (in the blank spaces provided) the INITIAL letters of the things they represent. For instance, Clue No. 1 shows three Stars, a Bin, a Nib and a Dog. As "bin" has







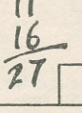
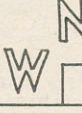





been reduced to "in" and "dog" to "g" (see strokes through letters), this leaves you with the word SING—the answer to the clue.

After deciphering the letters of a clue word and finding the spelling does not make sense, you must study the pictures again and think of the MAIN things they suggest. For example, you should not put "dust" before "bin" or "pen" before "nib." The initials of such words do not count or give a sensible word. All this is part of the puzzle and you should rarely go wrong.

Alternative words must also be considered. The alternative LETTERS of same are shown in white in groups of two's and three's. You may use any one of them which you think gives the best and most apt answer—but only ONE, please. Two letters in a single space will be disqualified.

This does not apply to the rest of the coupon, unless all the answers are wrong, of course. Should you happen to spoil a coupon, you can obtain fresh copies of Hobbies Weekly from our Back Number Dept., providing you enclose 3d. in stamps. NO COMPETITOR CAN SEND IN MORE THAN TWO COMPLETE SETS OF COUPONS, THERE BEING FOUR IN THE SET OF PUZZLES NUMBERING FROM 1 TO 15.

Full details of Rules and closing dates will be given in a subsequent issue.

PICTURE PUZZLE				No 1.	
				S	g
1. MOST PEOPLE DO THIS IN THEIR BATH.					
				N	Y
2. MANAGERS LIKE A GOOD ONE.					
				W	
3. A BURGLAR OFTEN FINDS THIS.					
					
4. OFTEN MANAGED WITH DIFFICULTY.					

PRIZES TO WIN

1st Prize A1 Machine Value 47/6 ; 2nd Prize Goods Value 17/6 ; 3rd Prize Hobbies Weekly free for 6 months (Value 6/6) and numerous Consolation Prizes.

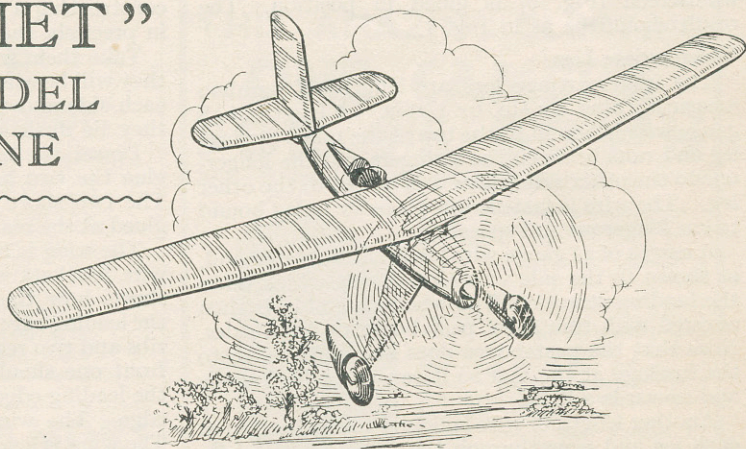
OVERSEAS SECTION :

1st Prize Goods Value 10/6
Hobbies Weekly Free for 6 months

1st Week's Picture—Three more!

The "COMET"

FLYING MODEL MONOPLANE



IN response to many requests, we have pleasure in giving details for making a flying model plane which anyone with a little experience can undertake.

It is a high wing monoplane with wing span of 25ins. and is designed from a practical model which has been thoroughly tested out. Moreover, a full size blue print of all parts is supplied to enable you to build easily. This "Comet" Blue Print measures 1ft. 8½ins. by over 2ft., and is obtainable for 1/2 post free from The Editor. Addresses from which suitable material can be purchased can be given at the same time if necessary whilst the author is willing to help any constructor who encounters difficulty.

Built for appearance as well as performance the "Comet"—which was designed and built especially for Hobbies Weekly—fulfils the requirements of those who desire to possess a model aeroplane which not only flies well, but also looks well both on the ground and in the air.

It is a streamlined semi-scale model which—due to its parasol wing—is extremely stable and is eminently suitable for spring flying as well as summer.

Full-size Blueprint

Supplied with complete patterns for all parts. Post free for 1/2 from Hobbies Weekly only.

Construction

As the plans shown on the full-size blueprint are drawn accurately to scale, all dimensions may be obtained direct. A simple fuselage is made first and the streamlining is formed by adding formers afterwards.

First we must make the fuselage proper which is constructed entirely of 3/32 sq. balsa. Lay a full size side view out on a flat board and place rows of straight pins along the inside and outside of the longerons to hold them in position. Add the upright braces using the cellulose glue liberally as the balsa is apt to absorb a certain amount.

Having made one side, build the other in exactly the same manner on top of the first. When dry, remove from the board and if the two sides have become stuck together, slit them apart with a razor blade.

Now obtain two pieces of 3/32 sheet balsa measuring 1in. by ½in. and fashion them into long thin triangles. Glue the two sides together at the tail with the triangles sandwiched

between them at the top and bottom (Fig. 9).

When dry, add the spacers in pairs, commencing at the tail and working up to the nose slipping a rubber band round the fuselage as each succeeding pair is placed in position. Note that both the top and sides are strengthened at the nose by adding sheet balsa instead of the 3/32 sq.

An extra wide piece glued in at the rear has a hole drilled through to accommodate the bamboo rubber anchorage pin. The decking is made by adding formers to each bay and then laying stringers along the whole length.

The Formers

A typical former is shown in Fig. 4. From the side view we obtain the height of the former and from the plan view we get the width and the distance between the stringers.

With these particulars it is a simple matter to draw out each former. They are cut from 1/16 sheet balsa, slots are cut in the top to accommodate the stringers and the middle is cut out for the sake of lightness. The corner pieces are cut out so each former can be slipped between the longerons and glued to the face of the spacer.

The stringers of 3/32 by 1/16 balsa are laid along the full length of the body at the bottom and from the nose to the leading edge of the tailplane at the top. At the last former they should be allowed to overhang ½in. This is useful later.

The stringers are cut away between the formers which form the front and back of the cockpit. Pieces of 3/32 sheet are glued in at each side to make the cockpit round. A headrest made from balsa is placed at the back and a thin celluloid

MATERIALS REQUIRED

BALSA.

- 1 sheet 3/32in. flat.
- 8 lengths 3/32in. sq.
- 4 lengths 1/16in. by ½in.
- 1 leading edge ½in. sq.
- 1 sheet 1/16in. flat.
- 1 sheet ½in. flat.
- 1 trailing edge ½in. wide.
- 1 balsa block 3 by 2 by 1 in.

SUNDRIES.

- 1 pair 1½in. celluloid wheels.
- 3 feet 18 gauge wire.

- 3 feet 22 gauge wire.
- 1 9in. diameter propeller.
- 1 small sheet, 8 mm. plywood.
- 6 yds. ½in. flat rubber.
- 1 length bamboo ½in. by 1/16in. by 18ins.
- 1 small piece celluloid.
- 2 sheets coloured Japanese Tissue.
- 1 bottle clear dope.
- 1 tube Cellulose Cement.
- 1 sheet thin cardboard.
- 1 brass bush inside diameter 18 gauge.

windscreen (Fig. 6) is glued in position. The result should be as in Fig. 1.

Undercarriage Legs

The undercarriage legs are lengths of bamboo measuring 8ins. by $\frac{1}{4}$ in. by $\frac{1}{16}$ in. A length of 18 gauge wire is bound to the top of the undercarriage leg and runs between the stringers and the longerons to the other side where it is bound to the other leg. The wire is fastened in place by being bound to the longerons and spacers.

A length of 22 gauge wire is similarly treated and, as shown in the side view, has a loop which takes the landing stresses. The whole assembly is then covered with thin sheet pasteboard on both sides. Note that the pasteboard does not quite reach to the fuselage at the rear so it can move backwards and upwards a little.

Another length of wire is bound to the bottom of each leg and runs through the wheel and back to the wheel fairing which is of hollow balsa Fig. 8.

The Tailskid

A tailskid is made of bamboo. The leading and trailing edges of the wing may be bought ready made or shaped from balsa strip. The leading edge measures $\frac{1}{4}$ in. sq. and the trailing edge $\frac{1}{4}$ in. by $\frac{1}{16}$ in.

The wing is made in two halves. First make a set of ribs to the well-known Clark Y Section. They are all cut from $\frac{1}{16}$ sheet balsa except the largest which are $\frac{1}{8}$ in. thick.

Lay the leading edge which is $\frac{1}{4}$ in. sq., the trailing edge which is $\frac{1}{4}$ in. by $\frac{1}{16}$ in., and the wing spar which is $\frac{3}{16}$ in. by $\frac{1}{2}$ in. balsa, on the plan and glue the ribs into position just as when

constructing a fuselage side. Make the other half in precisely the same manner.

Take them from the board and lie them flat as they will be when finished. Raise the tips to $2\frac{1}{4}$ ins. each side and then bevel the thick middle ribs so they lie flush with each other.

Dowel the leading edge with 18 gauge wire and glue the two halves of the wing firmly together. The two short spars of $\frac{1}{8}$ in. by $\frac{3}{16}$ in. balsa are glued at the rear as shown in the plan view.

The wing is held in place on the fuselage by two wire brackets which are of 22 gauge wire. Fig. 2 shows how these are twisted. One is bound to the leading edge and middle ribs and one the middle ribs and two rear spars mentioned previously. The front one should be the longer, by about $\frac{1}{8}$ in. so the leading edge is slightly higher than the trailing edge. The wing tips are of $\frac{1}{16}$ in. sheet balsa. The wing is held in place on the fuselage by rubber bands.

Tailplane

The tailplane is made entirely of $\frac{3}{32}$ sq. balsa and the rudder also except the leading and trailing edges which are $\frac{3}{32}$ by $\frac{1}{4}$ in. and the tips which are $\frac{1}{16}$ sheet. They are made like the fuselage side constructed previously.

The tail fixing, which was originated and developed by the writer, has been used on several models and has never failed to give satisfaction. Fig. 3 shows the leading edge. The thin piece of wood is .8 mm. plywood and the piece shown partly dotted is $\frac{3}{32}$ in. sheet balsa made so as to fit between the longerons. The plywood prevents it slipping completely through.

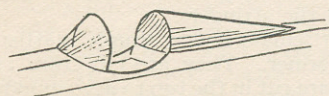


Fig. 1—Headrest and windscreen

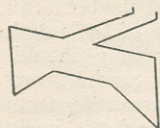


Fig. 2—Wing fixing to fuselage

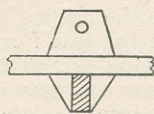


Fig. 5—Tail Trailing edge

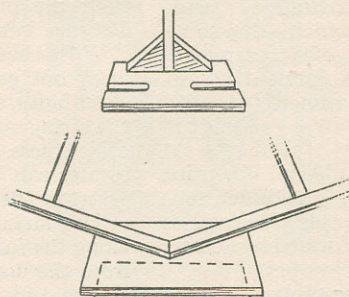


Fig. 3—The tail fixing described

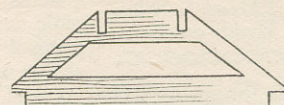


Fig. 4—A suitable former

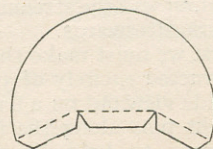


Fig. 6—Shape of windscreen

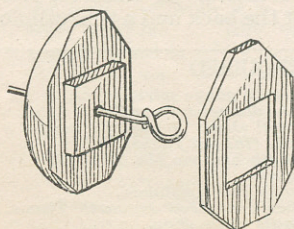


Fig. 7—The nose block and former

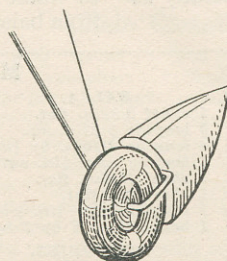


Fig. 8—The wheel fixing

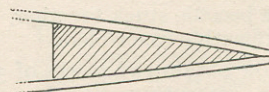


Fig. 9—Tail triangle as seen from above

Fig. 5 shows a plan view of the trailing edge. A small piece of plywood with a hole drilled through is firmly glued to the underside and a piece of 3/32in. sq. shown dotted supports it on the inside. The tailplane is placed on the fuselage so that this piece is just over the rear of the fuselage and the leading edge fits fairly tightly between the longerons.

A piece of bamboo about 3/4ins. long is glued to the bottom of the rudder and this passes through the hole in the back of the tailplane into a hole in the fuselage longerons.

Another piece of plywood is glued to the bottom of the leading edge as shown in Fig. 3 clamping the leading edge of the tailplane in position. Note the slots cut in each side.

The whole assembly is held in place on the fuselage by rubber bands. One is put round the fuselage at the front of the rudder but the slots permit it to be moved round for steering purposes. Another one passes round the fuselage and through the hole formed at the corner at the rear of the rudder. The overhanging stringers are filled in with 3/32in. sheet to cover the leading edge of the rudder as shown in the side view.

Nose Block

Fig. 7 shows the nose block and former. The nose block is of very hard balsa faced with plywood. The former, which is glued to the front of the fuselage is also of plywood. Note the 3/32 sheet at the back of the noseblock which is made to fit the hole in the former. A hole must be accurately

drilled through the noseblock to take an 18 gauge screwed brass bush or tube. It must be given 1/16in. downthrust and 1/32 side thrust to the right.

The propeller is a shop bought one 9ins. in diameter with a conical spinner of balsa attached. The propeller shaft is of 18 gauge wire. The complete model is covered with coloured Jap tissue which is sprayed with water to shrink it and then given two coats of clear dope.

If the wing warps upwards slightly it may be ignored as this has a helpful rather than detrimental effect on the model. The power is ten strands of 1/8in. flat rubber 20ins. long.

Flying

As the model is inherently stable, no difficulty should be experienced in obtaining good flights provided it is built properly. No structural alterations were necessary in the original model. The first day out it was flown four times hand launched and once from the ground. It proved extremely stable, concluding perfect flights with excellent landings, only overturning once through catching a tuft of grass.

If any difficulty is experienced in building or flying this model a letter to the Editor, enclosing a stamped addressed envelope will bring an adequate reply.

As described, the model would cost about 5/6 to 6/6 to build, although it could be constructed for less by substitution of hardwood wheels and a home-made propeller.

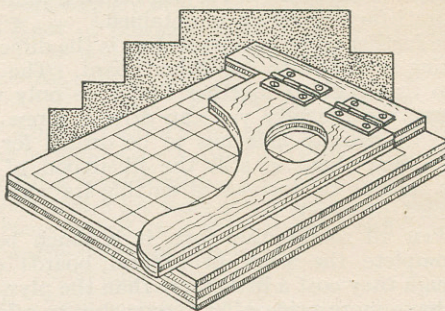
A SIMPLE PRINT TRIMMER

PHOTOGRAPHY necessitates many little gadgets, one of the most invaluable being a print trimmer, which helps greatly towards composition. Commercial articles usually consist of a divided bed (such as shown) mounted on a metal base, complete with a pivoted cutting knife. Such can be expensive, however, and many enthusiasts will find the one illustrated an ideal substitute.

The Bed Board

The dimensions mentioned in this short write-up give a board to take pictures up to 5ins. only; but having got the idea of the trimmer, one can easily enlarge upon same to suit individual requirements. Instead of using a side guillotine, of course, a penknife (or one-edged safety razor blade) is employed.

The bed board is a piece of 3/8in. or 1/2in. birch plywood measuring 5ins. by 6ins. When squared to size, divide it into 1/2in. squares as suggested. Do this first with the pencil, then score with a penknife, finally glasspapering and filling-in with pencil again.



The back fence is a piece of 1/4in. birch plywood 4 1/2ins. by 3/4in. The cutting guide—which is cut from the same thickness of material—measures about 6ins. long by 3ins. wide. Shape it as shown with the fretsaw, and be extra careful to see that all square edges are square, otherwise you'd be better off with scissors!

Glue and panel pin the fence in position, then hinge the cutting guide with two 1in. brass hinges, using 1/4in. by 3 flathead brass screws for the job. A piece of linen is pasted or glued to the underside of the guide, the hole (finger aperture) being made clear when everything has thoroughly dried. No finish—unless one coat of varnish—is necessary.

Prints are trimmed by setting them against the fence to project at the right-hand side to show the margin requiring to be cut away. The guide is closed down on top and held down firmly while cutting is in progress.



FRETWORK

A further article of
hints and tips to all
using fretwork tools

FOR the sake of those new readers, and indeed as some help also to the more experienced workers, it would not be out of place to say a few words on wood in connection with the use of the fretsaw.

Too little attention is often paid to this all-important material, and the worker is nowadays so apt to pick up a piece of cheap plywood and hope to make a satisfactory and attractive job with the use of that.

There is no doubt that the use of plywood is satisfactory, and indeed to be recommended in certain jobs, but it can never replace the excellent effect obtained by the use of the real wood.

Plywood is quite alright for the backs of cabinets, the bottoms of drawers, interior work where it will not be seen. But it is not to be recommended as the principal material to carry out the whole of the work, or to replace the natural boards which should be used.

Plywood Difficulties

The disadvantage of plywood is that if its edges show they look unsightly, then if you try to obliterate this by staining them down, the various plys soak in the stain in varying colours, and still an unsatisfactory result is obtained.

One further point against it, too, is the difficulty of fixing it end-on to any other board. The plys are so firmly glued together that it is only with the greatest difficulty you can drive a screw into them. A definite hole has to be drilled for the screw, then there is still the likelihood of the screw turning off instead of cutting its way into the hard plywood.

Taken all round, therefore, it is much better to complete the work in natural boards even although they cost a little more than the plywood. You have more pride of craftsmanship in offering the finished article for sale because there is always something which makes a plywood article look cheap and unsatisfactory.

A Suitable Surface

There is, too, a wide range of wood illustrated in *Hobbies Handbook*, and a study of this is helpful to any worker. These boards are specially selected and planed to the required thicknesses, and are really quite reasonable in price.

You can, of course, buy boards unplanned and unfinished, but the work involved in bringing them up to the same silky surface as the *Hobbies* boards, is really not worth the difference in cost. These boards, too, are specially seasoned and prepared for use with the fretsaw.

For instance, in the ordinary way beech is a very tough wood which would soon spoil the saw-blade. By our own particular steam treatment,

however, it is rendered suitable for cutting with the very tiny fretsaw blade.

The mahogany also is very popular, and, of course, there are two or three kinds of oak which are quite suitable for almost any work undertaken.

As a rough guide, none of the open grained woods should be used if there is a good deal of fretwork in the pattern. On the other hand, for large plain surfaces you cannot beat oak or similar grained boards.

HINTS ON WOOD, TOOL CABINETS, Etc.

Obviously, if you are cutting a lot out of this open grained stuff, you are weakening the whole thing and the narrow frets are more likely to break away than if they are cut out in sycamore or satin walnut, or something where the texture is more tightly knitted together.

Match all Boards

It is always advisable, too, to have all the boards for all the parts before you begin work. This is to ensure that they are all of a similar grain and surface. Because, for instance, mahogany can come from half a dozen different countries and even the same number of different trees at one source.

In consequence, there is a slight difference of texture and even of colour. So that, to get the same effect right through the article, select your boards and have them all alike before you begin. Then, of course, there is a difference between figured oak and plain oak. One has a very much mottled surface, and the other has a long sweeping grain which is equally recognisable.

Substitute for Oak

By the way, mention of oak reminds us that if you want to reduce the cost of large work, you can often substitute spanish chestnut for oak. Its grain and working are very much the same, and if stained down and polished it can be made so that only the expert would know the difference between the two.

Fancy Wood

One of the advantages of fretwork is the possibility of using a range of fancy woods not usually met with. There are in this way various colour effects which can be obtained quite easily to produce a distinctive and outstanding picture or piece of work.

There is satinwood, for instance, which is a

beautiful lemon shade, quite artistic in its colouring and effect. Or there is padouk which is a brilliant red, of a grain totally different from the ordinary mahogany.

Satin walnut is obtainable in different styles, although dark walnut is much more costly and rare now than it used to be. Rosewood is that silky surfaced board which can be polished up so brilliantly, but this is more expensive than the ordinary timber.

How to Buy Wood

Always remember it is cheaper to buy the wood by the board or the length, rather than have it cut to special sizes. If you want three pieces 6ins. square you can buy a board a foot and a half long and 6ins. wide much cheaper than you can by ordering the three separate pieces.

Then, too, in cutting out your work, use the edges of the wood as much as possible where you have a straight line required. This will often save an additional cut and so prevent further waste.

Indeed, it is always a good plan to have your patterns cut out in paper first roughly, then lay them about on the wood, moving them around to see in which way they will fit to be the most economical. You will often find you can save a good deal of timber by doing this rather than cutting off huge pieces just for one solitary part.

Keep Boards Flat

Do not forget, too, that if you have a stock of boards they should be kept flat and weighted down to prevent any likelihood of warping. Do not put them on damp ground or lean them against a damp wall. On the other hand, they should not be kept in a place which is too hot.

A reader was asking the other day as to the best way of keeping his various fretwork tools. This is probably a point which has arisen with others also. The ideal way, of course, is to have a wall cabinet for them, where they can be kept free from dust and atmospheric conditions.

A Suitable Cabinet

It is a simple matter to rig up a fairly flat box for the purpose. It need not be more than 4ins. deep inside, and can have a door hinged on to it. On the back of this board can be fitted a shelf or rack to take the handframe, whilst in the interior of the box itself when hung up are shelves, hooks and little clips for the other incidental tools.

The actual arrangement is a matter of taste, but the use of the Hobbies spring clips considerably reduced the labour of making, and certainly of fitting the tools in when being packed away.

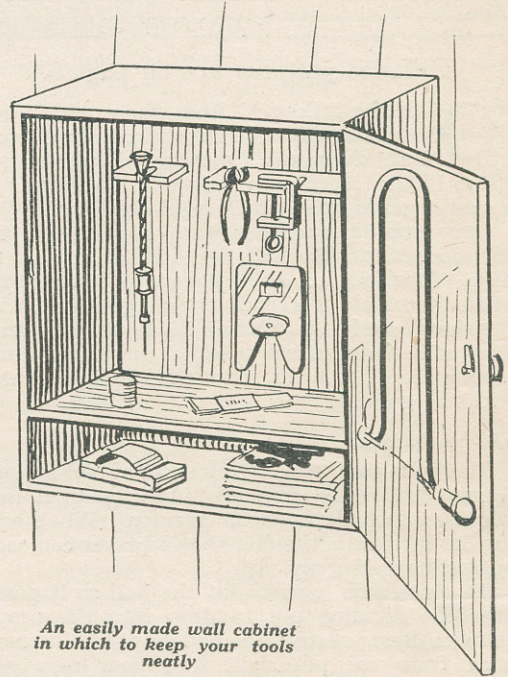
Support Brackets

If you want to go further, of course, you can add a little shelf and drawer at the bottom to take all those odds and ends of nails, screws, catches,

hinges, etc. which gradually accumulate. The completed cupboard should be hung on the wall, and it is a good plan also to put a couple of right-angle brackets as shelf supports on the underside.

They will take the weight and so save the bottom falling out of the box, if too much is put inside it. Of course, you should not leave the box in its rough state, but stain it down or paint it to a nice shade.

The door should be fitted with a catch and couple of panels painted on the front. Indeed, it can be made much more striking by adding a



framework around the door itself so a recessed panel is made in the centre. Remember to get fairly strong hinges, and to recess their flanges so the door closes to make an airtight fit.

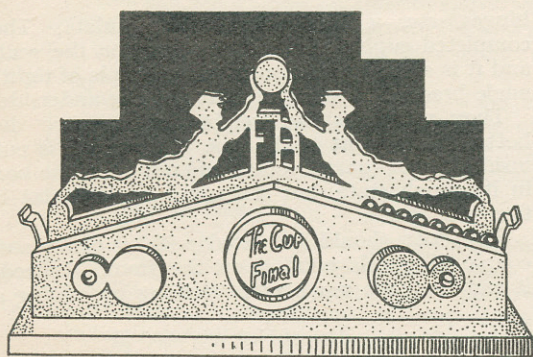
Fit Up Your Bench

There are unfortunately too many workers who leave their tools lying about haphazard after they have finished with them. This is particularly unfortunate because as amateur carpenters and woodwork people they have every opportunity of providing themselves with shelves, drawers or little cupboards as receptacles for them.

The work spent on jobs such as these is well worth it because they save the loss of tools, and at any rate prevent them being left about to become rusty and damp.

So it is worth while giving a little thought to how you can fit up for yourself tool cabinets or shelves in the workshop which will save you time, labour and patience when you are at work.

Special Boat Race Novelty with next week's issue



Full size patterns are on page 656

“OOP fer t' Coop!” And who wouldn't be? It will be a grand sight and a spiffing game. But, if you can't go, what about having a “Cup Final” Match of your own? We illustrate a simple game played with eight steel balls.

Only two opponents can take part. At the commencement, the balls are divided equally for play. It is the aim of the players to “shoot” the balls alternately into each other's goal, this being the right or left ball runway inside the structure. The balls automatically collect here; the man having the most in his opponent's goal, of course, wins the game.

The Manipulation

The balls are “shot” by means of end springs. A great deal of skill is required in the manipulation, because much depends on gravity. What adds further interest is the fact that a player can score against himself easily.

To score, you have to hit the ball so it passes over the dividing pin to drop into the proper channel. Being of steel, the ball is apt to “bounce” back from the pin right into your own goal mouth!

Here are some more points. Should the ball “leap” over the pin and travel down to the other player, he can send it back to score a goal for himself and vice versa.

Should the ball only travel half way up the track and roll back to the player, he can repeatedly hit it until it passes his side of the border, so to speak.

Cutting the Parts

The various parts are cut from $\frac{1}{4}$ in. and $\frac{1}{8}$ in. plywood. Patterns are provided on page 656. In cutting out the back, do so as shown. The front piece is minus the black silhouette portion. Note particularly the position of the square outlet holes to be cut in same (see dotted lines).

Take special care in cutting the runway piece. It would not be fair if one half were lop-sided so that the ball would run in easily. The disc with the “Cup Final” on it must not be pasted to anything.

The patterns of the outlet covers can be adhered

MECHANICAL “CUP-FINAL” SPRING-BALL GAME

to remain on the wood to distinguish the rival sides or such can be painted red and blue later.

Assembly

Having cut out the parts, drive a shortened pin through the back where indicated on pattern (see Fig. 1) to project $\frac{1}{4}$ in. Glue the runway neatly in position and cover with the face piece, the lot being glued to the mortises of the base.

If the mortises are cut to slope towards each other, just slightly, this will help to keep the back and front tight against the central portion; if the mortises are cut in the reverse way, a few panel pins must be driven through the parts to keep them together, so this should be borne in mind.

The ring of wood can be glued to the face of the work in the centre as shown. If you prefer to enamel the parts, this should be done now. The base and sides could be grey.

The inside of the track should be coated lightly. The two covers (Fig. 2) are drilled to suit $\frac{3}{8}$ in. by 4 roundhead brass screws, then painted in contrasting colours.

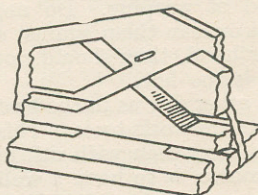


Fig. 1—Detail of runway with pin in place

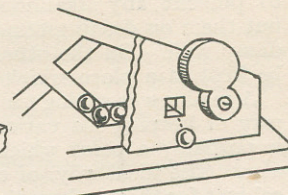


Fig. 2—Showing the ball runway and outlet, with cover raised

Having screwed the covers in place (the screw holes must be cleaned out well after the paint has dried), make two springs the size given. The long arms on a pocket flashlamp battery are ideal for springs. Bend the thin brass to shape, then drill and screw them to the ends of the work.

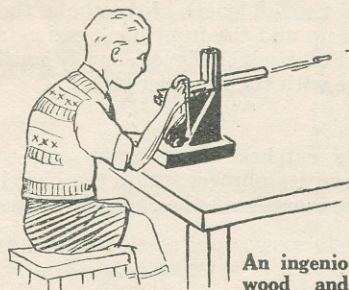
That procedure completes the novelty. The steel balls used must be $\frac{3}{16}$ in. diam. They are obtainable from any bicycle shop or from Hobbies Ltd. The dividing pin can be tapped into the front side to keep it firm.

The wording is glued within the ring at the face.

MATERIAL REQUIRED

1 piece plywood, 7ins. by 4ins. by $\frac{1}{4}$ in. thick.
1 piece ditto, 6ins. by 6ins. by $\frac{1}{4}$ in. thick.
1 piece springy brass, 3ins. by $\frac{1}{4}$ in. by $\frac{1}{32}$ in.
8 steel balls, $\frac{3}{16}$ in. diameter.
2 roundhead brass screws, $\frac{1}{4}$ in. by 3in.

Every Reader should belong to the Hobbies League



An ingenious toy made in wood and firing little "wooden shells"

NOVEL AUTOMATIC QUICK-FIRING GUN

ON the centre pages of this issue we have patterns for the making in wood of the gun illustrated herewith. It is a novel mechanical toy which can be made from a few odd pieces, and which fires short pieces of dowels cut as shells.

The firing is automatic, for as fast as you pull back the handle and release it, so the shell is shot out with considerable force through the barrel. Thicknesses and dimensions are given on the respective patterns, and all parts can be cut in fretwood although the pieces F.G.L.O.P.Q.R. are stronger if cut from plywood.

Beyond the wood, the fittings required are 1ft. small brass chain, two screw eyes, a strong $1\frac{1}{4}$ in. hinge, a wingnut and bolt, elastic band or strip of elastic and 6ins. stout wire. The cost of this is but a few pence.

All parts are lettered in the pattern sheet, and in the detail herewith, so you can follow the construction exactly. Notice some parts of the patterns have to be elongated to the length shown, whilst in the case of the base this must be marked out according to the measurements indicated. A

hole is cut in this base in the centre, and this is shown 1 $\frac{3}{4}$ ins. from each side.

The base is constructed of a floor and four sides through which the upright gun can be elevated or lowered by means of the wingnut and sliding piece at the back. The body of the gun is hinged at the front, as can be seen in the diagram, but is held by the wingnut and bolt at the back.

The sliding piece (Q) is actually glued to the base, then has the bolt passed through it. It actuates in the slot in the centre pieces M which form the main portion of the gun.

The Main Portions

Two of these pieces M are required, then outside them two other pieces N are fitted with the long upright standing vertically.

Notice, by the way, these two pieces are shown together on the pattern sheet, and must, of course, be traced off separately.

The gun barrel is formed of four pieces of $\frac{1}{4}$ in. material, two wide pieces forming the sides A, and two pieces coming between them to form the thickness. The bottom spacing piece B extends the whole length, but the upper piece is formed of two parts C and D. D comes at the front end of the barrel level with the end, whilst C comes at the back also level with the end.

Shell Chamber and Barrel

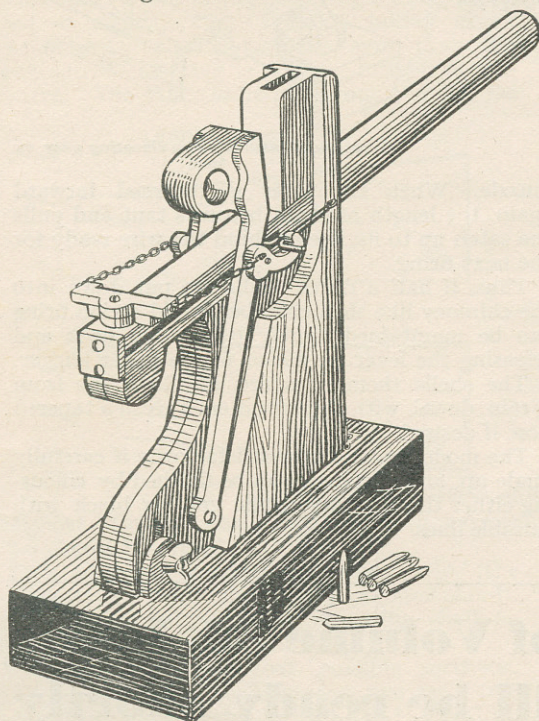
There is thus a space between C and D which allows the shells to drop down from the shell chamber into the barrel itself. The centre aperture is thus square, but this is immaterial. The part projecting beyond the front of the upright N should, however, be rounded off after the glue has set.

Above the barrel and between the two sides N come the shell chamber made from the two pieces H, the part I and the piece J. This shell chamber is built immediately over the opening in the top of the barrel, so allowing the shells to pass down in rapid succession as required. The back end of the barrel is covered with the cap L, screwed on as shown.

Firing Levers

The two levers O are pivoted on to the side of the centre pieces M at the points shown by a cross on the pattern, and the space between them at the top above the barrel is filled in by the three pieces forming the trigger hold P.

A little way down the lever piece is put the catches R, and they are screwed with the actual catch towards the barrel. Do not fit too tightly, but just so that they will drop fairly easily, a small washer of $\frac{1}{8}$ in. wood being placed inside to get the right distance.



The completed gun and "shells"

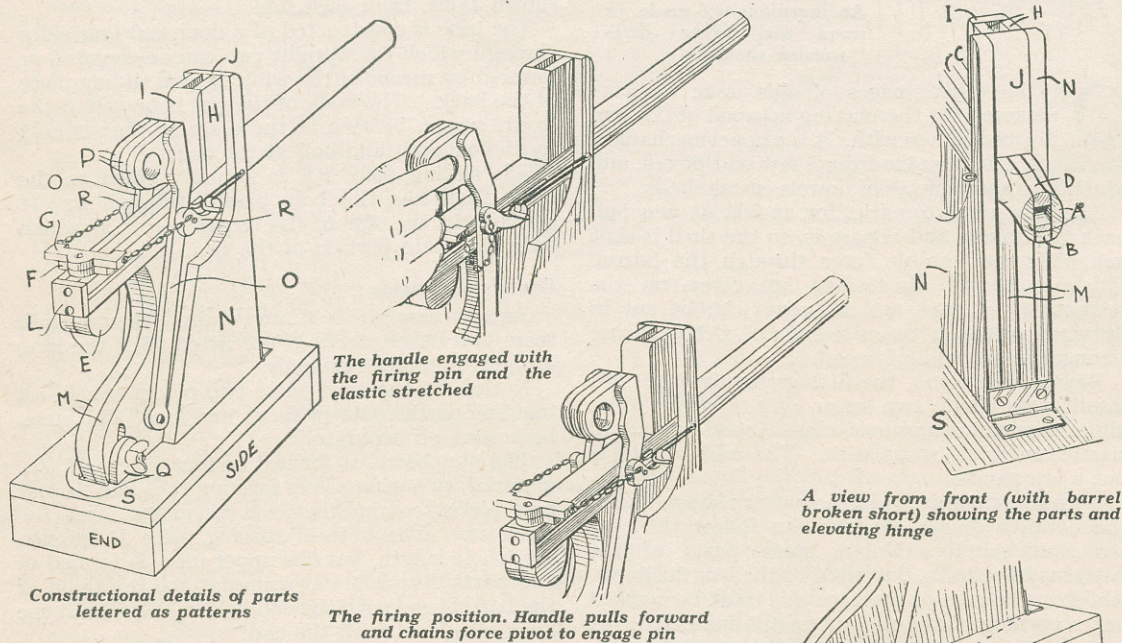
The plunger (K) is shaped as shown in the picture, with the patterns. It must slide up and down the barrel comparatively easily through which at the points shown is a very stiff piece of wire. Put one end through the plunger, then make a turn in it exactly the size and shape shown with the pattern. This can be done with small pliers.

At the back end of the barrel on top of which are

is brought forward the full length of the chain, the catches are pulled up and the front hook end gets under the wire. Pull back the lever sharply until the catches engage with the arm pieces G.

Automatic Return

These turn the catches down again and so release the wire and its plunger inside the barrel. These shoot forward and rush the shell out of the



glued the two pieces forming the back of the general mechanism. The piece F is a spacing piece, whilst G is screwed above it but not glued down. To the outer arms of this piece G will be screwed on the length of chain which passes to the point shown in the catches R.

To get the length of chain throw the lever forward until the catches engage with the straight portions of the wire. Cut the chain and fix both points mentioned with round headed screws. Now a length of elastic—a couple of ordinary short bands will do quite well if they are strong—is required to form the spring action.

The Plastic Drive

This elastic is fixed to a small screw eye or staple driven into the sides N in line with the barrel. The other end of elastic is carried round the loop in the wire. There should be enough spring in it to keep the whole wire and plunger forward.

Now you see what happens. When the lever O

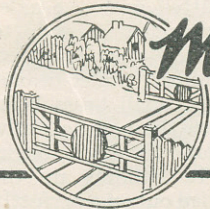
muzzle. When the lever is returned forward again, the length of chain becomes taut and pulls the catch up to fix itself behind the wire ready for the next firing.

Thus, if half a dozen shells are put down into the chimney-like shell chamber, rapid action firing can be maintained merely by pulling back and releasing the lever by means of the finger trigger.

The shells themselves are 1in. long cut from 3/16in. dowel, with their front ends given a tapered nose if desired.

The model works quite satisfactorily if carefully made up, and of course, can be finished by colouring either the ordinary battle grey or black with suitable lines.

This is the last Issue of Volume 85. Index and Binding Cases will be ready shortly



Model Railway Accessories

AN OO GAUGE TRANSPORTER WAGON

AMONG special-load wagons, perhaps the L.M.S. locomotive transporter is one of the most imposing and fascinating types. A model of this vehicle in the 4 mm. scale measures over 12 ins. in length and presents some really attractive features.

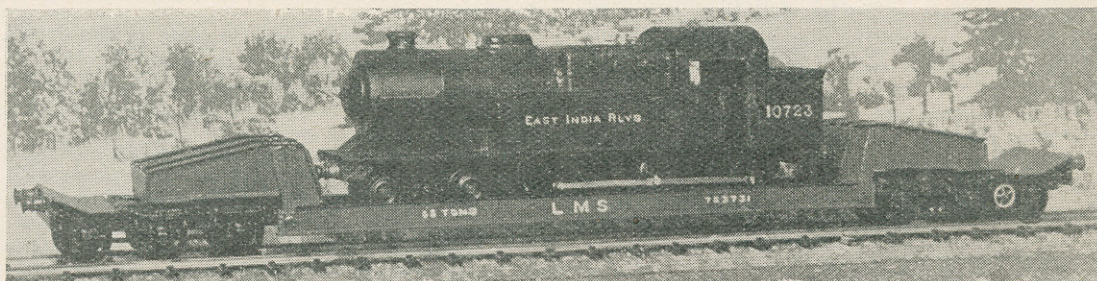
The wagon has twelve wheels, divided into two sets of six, each set forming a swivelling bogie at either end. The bearing principle of the vehicle—or of that portion of it which carries the load—is that of the cantilever.

An examination of the drawings will show that the body unit is formed in three parts, one main centre truss and a pair of lever-locked weight

J39 Class goods engine—has thus been denuded of its upper fittings. If the type carried is of the narrow-gauge variety, or a smaller example of standard engine, this is not essential. In the photograph the load consists of a free-lance narrow-gauge engine which clears the standards freely.

This model was made by the writer, and was later purchased by an Eastern prince, well known to the public, who took a liking for it.

The drawings should make clear the general method of construction. The levered ends of the body are formed of girder worked up from tinplate strip in the manner already described in an earlier article, and each consists of three upright members,



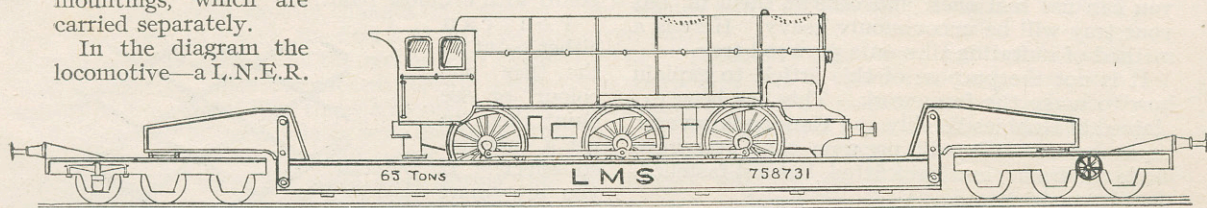
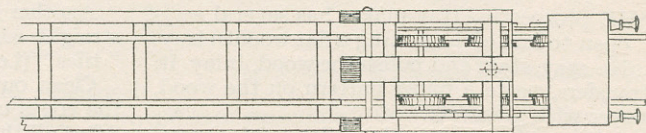
retainers at the extremities. In the actual vehicle the main truss is so arranged that, by detaching the pivots at one end the main body of the wagon lowers to track-level, so that the locomotive load may be drawn on to the conveyor straight from the rails.

The truss is then jacked up again into place, the load rigidly chained and checked in its place and the disjoined end re-attached for transit. Owing to the raising of the locomotive load some distance above the tracks for conveyance, there is sometimes insufficient head clearance for the load to clear the gauge; and in this event the locomotives are transported minus the boiler mountings, which are carried separately.

In the diagram the locomotive—a L.N.E.R.

all six being cut to the same cardboard form from sheet tinplate, not too thick.

In each case the three sections are joined together by cross-members as shown. The main truss is very simple in form, with cross-members connecting the two sides. The perpendicular bars are of drilled brass strip, which is soldered or sweated on to the end sections rigidly, the pivots applying only to the main truss.

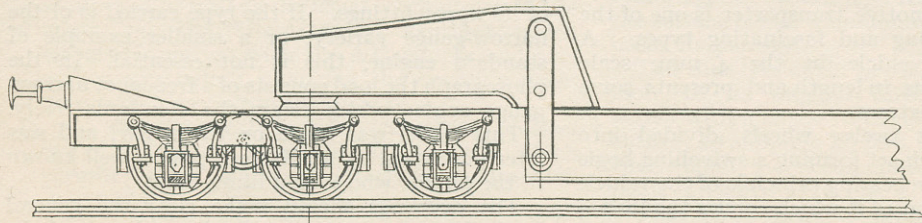


A scale elevation and plan of the wagon

These pivots are shortened blanket-pins—a form of super-giant common pin which can be bought in sheets. Their advantage for the purpose is that they have a nicely shaped round head which fits flush against the side. Either is left so that it can be withdrawn at will, and the truss thereby lowered.

Along the full length of the truss are soldered the running rails.

In the writer's model these were fixed to standard



A full size detail of the wheels and part of chassis

gauge; but they could with a little exercise of ingenuity be arranged to allow for variable gauge, though on a standard gauge layout this will be an unlikely requirement. The drawings show the full side elevation and the plan to a reduced scale, and the half of the elevation, or thereabout, to full size for OO-Gauge.

The bogie ends are made in much the same manner as those of the breakdown crane, though the latter were fixed frames, not bogies. Ordinary tender axleguards are employed, being first drilled out by finger-turning a 1/16in. twist drill in them until they are perfectly cleared out.

The side frames are then fitted with the axleguards and thereafter built up with tin strip to shape and style. The standard wagon buffers are soldered into the streamlined buffer-beams.

The bogie pivots are simply small brass bolts and nuts with washers between the body and the bogie. The brake wheels, one for each bogie, are also standard fittings. In building up the bogies, the work should be carried out on a perfectly level surface such as a small sheet of plate glass

or a piece of planed six-ply wood, so that they will when finished reveal no twist or discrepancy.

The load itself need not be of a very elaborate

nature. The engine can be built up nicely from wood, as the load in the photograph was, the wheels and frames being the only metal parts of the engine.

The cab roof and spectacle plate in the drawn model have also been partly dismantled. For the rest, the engine is complete—as fully complete in outward form as the exigencies of the loading gauge will allow.

It may be painted a shop grey colour throughout, or, if the model is entire, it may be finished in its full company livery. The trolley itself is standard L.M.S. grey, lettered as shown.

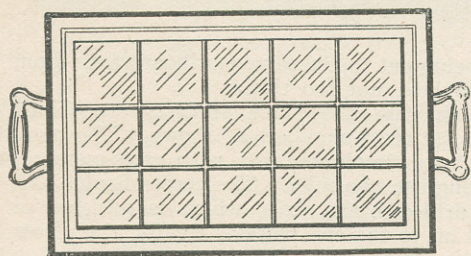


Fig. 1—The finished article

THE prospective tray-maker has several ways open to him of decorating a flat wooden tray.

He may stain and polish the wood, inlay it, use transfers, paste a paper pattern on the wood, and cover with glass, etc.

Here is another way: Use tiles. Of course, you can use real ones, and cement them in, but your tray will be uncommonly heavy. Here is a method of imitating tiles on a plywood tray.

It is not the purpose of this article to explain how to make the framework. This has been explained in *Hobbies Weekly* and *Handbook* several times before. We will presume that you have made the frame, and have fitted, but not fastened, the plywood bottom.

Take this bottom and divide it into a convenient number of "tiles," which are marked out in pencil. Mark parallel lines 1/16in. on either side

AN IMITATION "TILED" TRAY

of these so that there are a number of channels, 1/8 in. wide.

Saw cuts are then made along these right across the wood, down to the first layer of the ply. It is then an easy matter to split out these grooves, so that the wood looks like Fig. 2 in the drawing.

Another method is to use a penknife and a steel straight edge. Be particularly careful to cut the "tiles" (i.e., the grooves) in perfect alignment.

Clean out the grooves with glasspaper, so that the edges of the "tiles" are rounded off a little. After all the sawdust has been removed, paint the board with cellulose paint.

You can either paint all the tiles one colour, or else paint them to get a chequered effect. If you are smart in painting you can even try a mottled design.

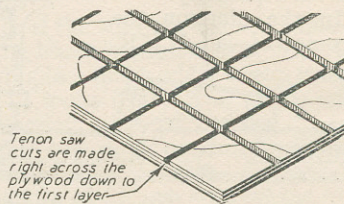


Fig. 2—Grooves to form the tiles

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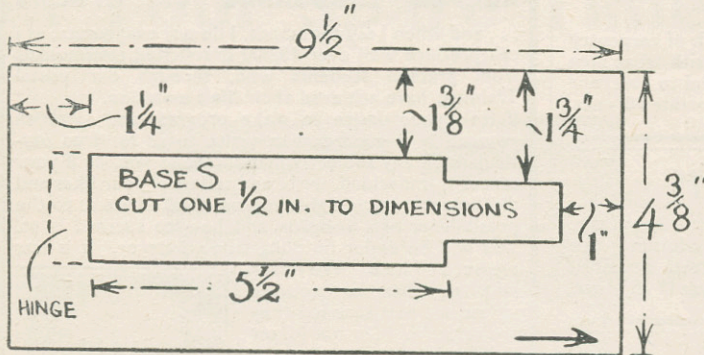
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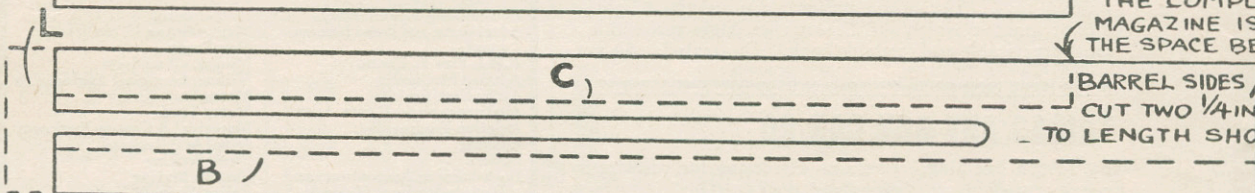
SIDES CUT TWO 1/2 IN. 8 1/2 IN. X 1 1/2 IN.

ENDS CUT TWO 1/2 IN. 4 3/8 IN. X 1 1/2 IN.

ONE 1 1/2" BRASS
HINGE IS REQUIRED

TOP SPACING PIECE D CUT ONE 1/4 IN.

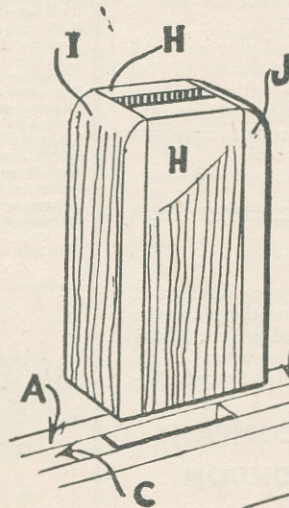
TOP SPACING PIECE C CUT ONE 1/4 IN.



B BOTTOM SPACING PIECE OF BARREL. CUT ONE 1/4 IN. 12 INS. LONG

SIDES OF MAGAZINE H
CUT TWO 1/4 IN.

BACK AND
FRONT OF
MAGAZINE
I & J
CUT ONE OF
EACH 1/4 IN.
AND SHAPE
TO SECTION



PIECE F CUT
ONE 1/4 IN.

PIECE G CUT
ONE 1/4 IN.

SHOWING HOW
MAGAZINE FITS
OVER SPACE
BETWEEN C & D

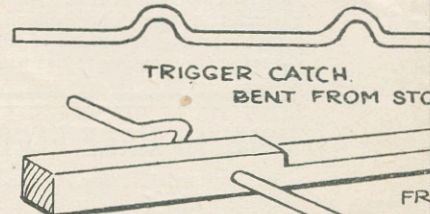
PIECES
CUT TWO

PIECES
CUT TWO
1/4 IN.

LEVER

POSITION OF SCREW-EYE
FOR ELASTIC.

PLUNGER K
CUT ONE 1/4 IN.

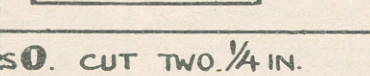
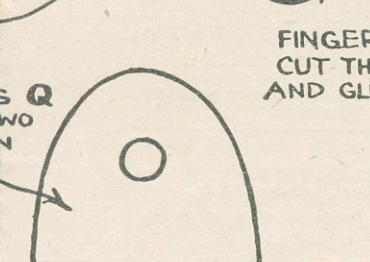
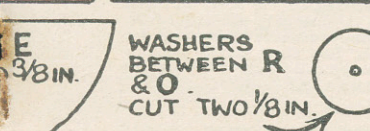
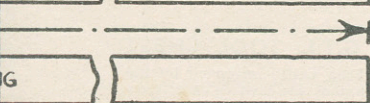
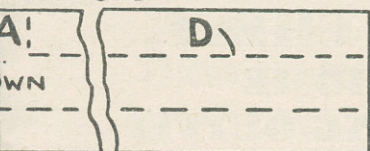


SCREWS

STRENGTHENING CAP L
ON BARREL
CUT ONE 1/4 IN.

OUT WIRE
ONT END
OTHER SIDE

ETED
GLUED OVER
TWEEN C & D



OUTSIDE PIECES **N** OF GUN CARRIAGE
CUT TWO $\frac{3}{8}$ IN.
TO THIS LINE

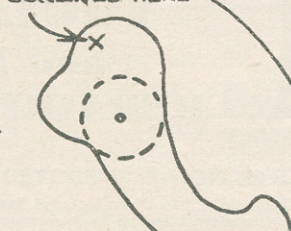
Full size patterns for a NOVEL AUTOMATIC QUICK - FIRING GUN

For constructional details
and drawings, see page 635

Design No. S.D. 16

CENTRE PIECES **M**
OF GUN CARRIAGE
CUT TWO $\frac{3}{8}$ IN.
TO THIS LINE

CHAIN IS
SCREWED HERE



CATCHES **R**
CUT TWO $\frac{1}{4}$ IN.

FINGER PIECES **P**
CUT THREE $\frac{1}{4}$ IN.
AND GLUE TOGETHER

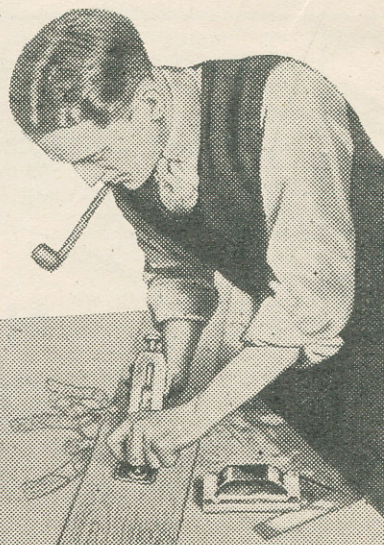
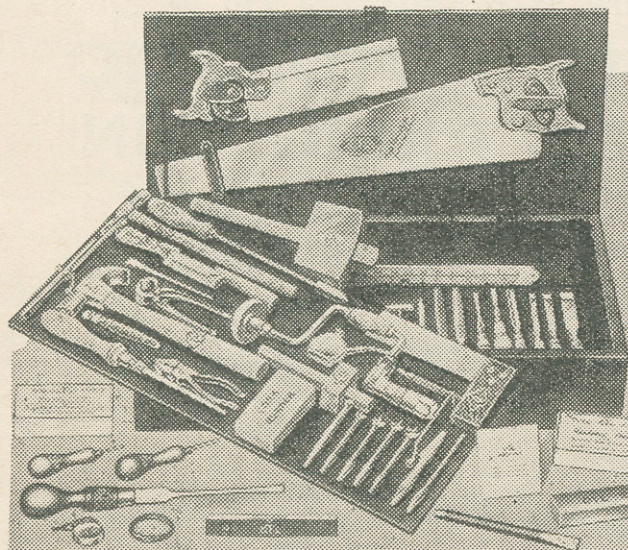


A SCREW MUST BE PUT
THROUGH LEVER **O** AT **+**
AND SCREWED TO THIS POINT

THE THREE PIECES
P ARE GLUED BETWEEN THE
TWO LEVERS **O**

R IS SCREWED HERE

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The AMATEUR ELECTRICIAN

ACCUMULATOR CHARGING FROM A.C.

LARGE numbers of small accumulators are still used for such purposes as wireless receiving sets, driving models, lighting miniature lamps, etc., and there are many readers who would welcome the means of re-charging them at home instead of carrying them to and from the nearest charging station.

Not only would this save delay and trouble, but the batteries would in many cases receive more consideration and last longer than when treated in bulk along with others of varying size and condition.

The one thing that discourages home charging as a rule is the fact that the public supply of electricity is nearly always alternating current, whereas to recharge an accumulator requires a source of direct current as everyone knows.

How to convert an "alternating" into a "direct" supply is therefore the problem, and unfortunately most of the usual means of doing so are too expensive to justify the necessary outfit just for occasional needs.

Difference between A.C. and D.C.

There is one way out of the difficulty however, which is within reach of all, and that is by the use of a Chemical Rectifier as here illustrated. This is easily made up at home, is simple in construction and the materials are inexpensive. Fig. 1.

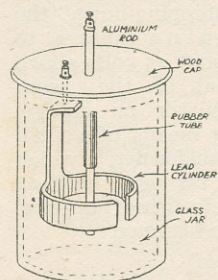


Fig. 1.—The complete Chemical Rectifier

Most people are aware that there is a difference between alternating and direct current. In the first case the current rapidly changes its direction in a wave form as Fig. 2, the first half cycle from A to B being positive, and the second half cycle B to C negative, when the process repeats again, usually at the rate of fifty times a second.

Obviously, if an accumulator were connected to such a circuit as this it would never acquire a charge, as any charge imparted to it during the first half of the cycle, would be discharged by the reversal of current direction in the succeeding half cycle.

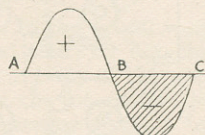


Fig. 2.—Wave form of normal alternating current.

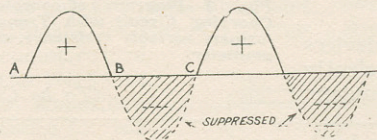


Fig. 4.—Half-wave rectification;

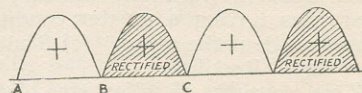


Fig. 3.—The same with reverse waves rectified

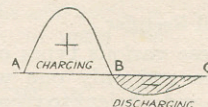


Fig. 5.—Effect of Charging with rectified A.C.

What has to be done, therefore, to render it suitable for accumulator charging is either to change the direction of every alternate half-cycle (as in Fig. 3) so the original alternating wave form becomes a series of intermittent impulses all in the same direction, or else to suppress the reverse half of each complete wave (as in Fig. 4).

Full-wave or half-wave rectified A.C. as this is termed is not precisely the same thing as direct current (D.C.) The latter has a more or less steady value, while the former, although always in the same direction, consists of a series of impulses. However, it is quite effective as a means of accumulator charging, except for that portion of the wave where the voltage drops to zero value or is actually below the counter electromotive force of the battery on charge. The greater part of the impulse is effective and the slight discharge that occurs when the charging voltage drops below the battery voltage is so momentary as to be of little consequence.

Batteries and Cells

The terms "battery" and "cell" are rather loosely applied sometimes, and it is well to remember that there are two kinds of battery. The "Primary" battery is either a wet or so-called "dry" cell, wherein the elements are of

two different materials. One of these is chemically acted upon by the solution with which it is charged and wastes away all the while a current is being given out.

The "Secondary Battery" or accumulator can only give out a current after it has been previously charged by passing current through it in a reverse direction. Its elements undergo a chemical change during the charge which enable it to give out current subsequently until the plates are restored to their original chemical condition once more.

Either form can be composed of a single cell or

a number of cells ; only when there is more than one cell is it correct to call it a battery.

A.C. Rectifiers

Among the various devices in use for the conversion of alternating to direct current are :—
(1) The Motor-Generator, consisting of an alternating current motor coupled to a direct current dynamo. (2) The Rotary Converter, in which an armature rotates in an ordinary field magnet but the armature winding is connected to sliprings at one end as well as the usual commutator at the other. (3) The Vibrating-reed Rectifier, which vibrates in unison with the A.C. supply and acts as a 2-way switch, changing the circuit connections with every alternate wave of A.C.

(4) The Chemical Rectifier, consisting of electrodes in certain solutions of chemicals which permits current to flow more freely in one direction

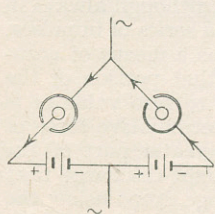


Fig. 6. Charging two Accumulators with two Rectifiers.

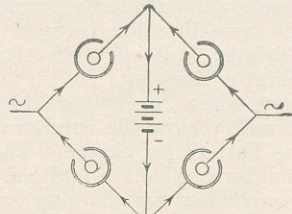


Fig. 7. Charging by full-wave Rectified current

than in the other. (5) The Thermionic Rectifier which depends for its rectifying action on the varying resistance offered between its cold and hot electrodes in a gas-filled tube, as the direction of current changes. (6) The Mercury Arc Rectifier in which an electric arc is formed in a glass or steel container between mercury and graphite electrodes having a greater conductivity in one direction than the other. (7) The Copper Oxide, or "dry" Rectifier.

This consists of alternate plates of copper oxidised on the surface, and of lead discs assembled under great pressure, rectification being effected by the differing resistance offered to the current according to the direction of its flow.

The Chemical Rectifier

Of all these various types of rectifying devices there is one and only one which is sufficiently inexpensive and efficient to recommend for amateur

construction, namely the Chemical Rectifier, sometimes known as the "Nodon Valve." Its action is perfectly simple like its construction.

A small aluminium rod is allowed to dip into a solution of ammonium phosphate, and is surrounded by a cylinder of sheet lead. When this is connected to an alternating supply, current passes freely from the lead to the aluminium electrode during the first half cycle, but as soon as the current attempts to reverse its direction in the following half cycle a high resistance film forms on the surface of the aluminium which strongly opposes its passage.

This dissolves again as the current reverses once more to its original direction. Although the action with a single rectifying cell is not sufficient entirely to suppress all flow of reverse current the effect upon the accumulator from the charging point of view is as in Fig. 5.

That is, a series of strong charging currents followed by weak discharges, the nett result being that the battery becomes fully charged ultimately.

With two rectifying cells and two batteries connected as in Fig. 6, each battery receives a charge in turn, and both halves of the alternating current wave will be made use of.

Voltage Transformation

If "full-wave" rectification is desired with only one battery on charge, four rectifying cells will need to be employed, coupled up as in Fig. 7.

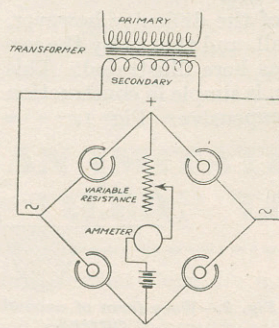


Fig. 8—Diagram of complete Charging Circuit with Transformer, variable resistance, and ammeter

When charging low-voltage batteries, such as 2, 4, 6 or 12-volts from the full mains pressure, it is advisable to reduce this, either by the use of lamps in series or by "stepping-down" the mains voltage to about 25 volts above that of the accumulator on charge, by means of a small transformer, which is far more efficient than using lamps as a resistance.

(To be Continued)

Model Aircraft Topics—(Continued from opposite page)
maximum chord, or better still, two-thirds So much for taper ratio.

As to how the taper is to be applied, considerable difference of opinion exists, and moreover, opinion changes from time to time. Some years ago, it was held that method 'A' was sound, and method 'B' undesirable.

Nowadays it is contended (in the light of later experience, let us charitably assume) that 'A' is doubtful, and 'B' the soundest method.

One would feel happier if there were no prospect of this verdict being reversed in the light of still further experience! Personally, the writer has used 'A' for years without encountering trouble. Anyway, no one seems to have any objection to

method 'D,' so when playing for safety and efficiency rather than experimenting, it is perhaps wisest to use 'D,' with the trailing-edge swept forward twice as much as the leading-edge is swept rearward.

In the matter of the wing-tip shape, a 'humped' ellipse, with the hump towards the front, and the rear edge curving in a much wider sweep (shown in A, B, C and D) looks distinctive, and is entirely satisfactory in action.

In conclusion, one would again stress the importance of careful workmanship. In fact, apart from the avoidance of excessive taper, the quality of the workmanship is the factor of greatest consequence.

THE DESIGN OF TAPERED WINGS

MODEL AIRCRAFT TOPICS

RECENTLY some hints were given as to the relative advantages of tapered wings and the simpler type in which the chord remains the same from the roots to the tips. The purpose of this article is to carry the discussion a little further than would be possible under 'Notes and News.'

It will be recalled that tapered-wing superiority is partly due to the reduction of 'end losses,' and partly to the better distribution of the structural material. By reducing the chord at the tips, one reduces the amount of air spilled, and incidentally, the amount of disturbance which may affect the entire wing.

Tapering also has the beneficial effect of reducing the amount of wood towards the tips, and transferring it to the roots, where the greater flying stresses are encountered.

In model sizes, these advantages are not very great, and can be nullified by poor workmanship, or by tapering in an unsuitable way. A constant-chord wing is easier and quicker to build, and a well-built wing of this type will be superior to a poorly-built tapered wing.

Forms of Taper

There are various ways of tapering a wing. Some taper so slightly that, without taking check measurements, one cannot be sure that the appearance of tapering is not due merely to perspective. The other extreme is found in the De

sweep leading-edge rearward and trailing-edge forward, an equal amount (C), or one more than the other (D)?

The Stability Question

The constant-chord wing has this advantage, that with any normal wing-section, should stalling occur, it will begin at the roots.

This is likely to result in nothing worse than a switchback flight, and possibly a heavy landing. Such mild effect *can* be obtained with tapered wings, but if the taper is excessive, the wing may stall first at the tips, and moreover, suddenly and on slight provocation. This cannot fail to spoil the flight, and may lead to a disastrous dive.

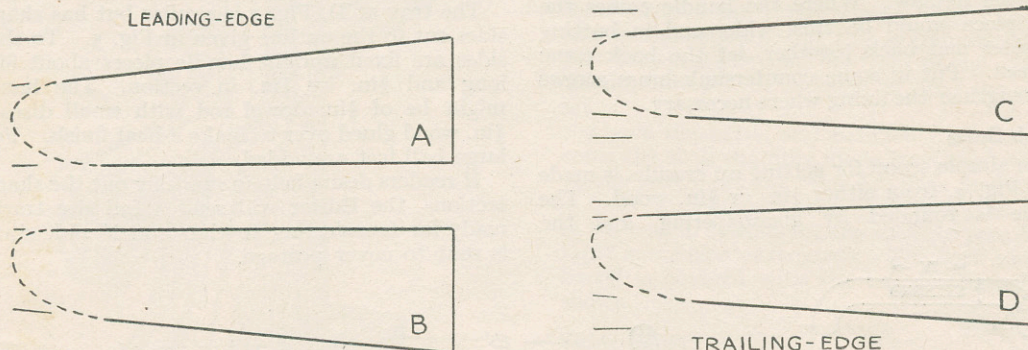
Curing Stalling

It is comforting to know that, should one be building a flying-scale model of a machine with such wings, the stalling difficulty can be cured, or at least considerably lessened, by so building the wing that the tips meet the air at a lesser angle of incidence than the roots, say 2 degrees difference.

This is achieved by bending the trailing-edge slightly upwards at a point one-third of the distance from the tip to the root. This 'washout' of the tips, however, does not necessarily make the highly-tapered wing entirely satisfactory.

The Safest Form of Tapering

The view is held quite strongly today that any wing of less than $3\frac{1}{2}$ inches chord is inefficient, and



Four different methods of tapering a wing, as explained

Havilland 'Comet,' the wings of which narrow down almost to a point.

Then, when one has fixed the 'taper ratio' (the relation of minimum chord to maximum chord), one has to consider how the tapering shall be applied.

The diagram shows four possible methods. Shall we sweep the leading-edge rearward (A), or sweep the trailing-edge forward (B)? Shall we

while the writer is not prepared to endorse this precise amount, his experiences do suggest that the tips of highly-tapered wings, in certain cases, contribute little or no lift.

Hence, unless one is prepared to risk loss of performance, a moderate amount of taper should be employed. To be absolutely on the safe side, keep the minimum chord at least half the

(Continued on opposite page)

USEFUL ARTICLES made with the FRETSAW

It is surprising what useful articles can be made from odd pieces of wood which have been left over from some larger piece of fretwork. Quite a number of workers no doubt find they have perhaps a box full of odds and ends, strips and squares of wood of varying thicknesses too good to burn.

The simple articles shown here will give an idea for their use, and we shall from time to time give further suggestions which would be useful in making really suitable things for bazaars and sales of work.

At A, in Fig. 1, is a crumb tray made from three pieces of wood. In Fig. 2 the dimensions are given. The large flat piece measuring 9½ ins. by 6 ins. should be of ½ in. stuff, with rounded corners. A thicker piece is glued along the back to take a handle, with a plain section glued and screwed as Fig. 3.

Taper off the front edge from underneath and make smooth with glasspaper.

Crumb Tray

The Crumb Tray at B, Fig. 1 is similar, except it has shaped sides and a back about 1½ ins. deep. This simple shaping is easily marked out and cut with the fretsaw. Where the handle comes the back piece would be 2 ins. wide, and in butting the sides and back together, let the back come between. Put in some countersunk brass screws to strengthen the fixing where necessary.

Crumb Scoop

The simple scoop for getting up crumbs is made as in Fig. 4, from either ½ in. or ¾ in. wood. The handle is rounded by glasspapering, and the

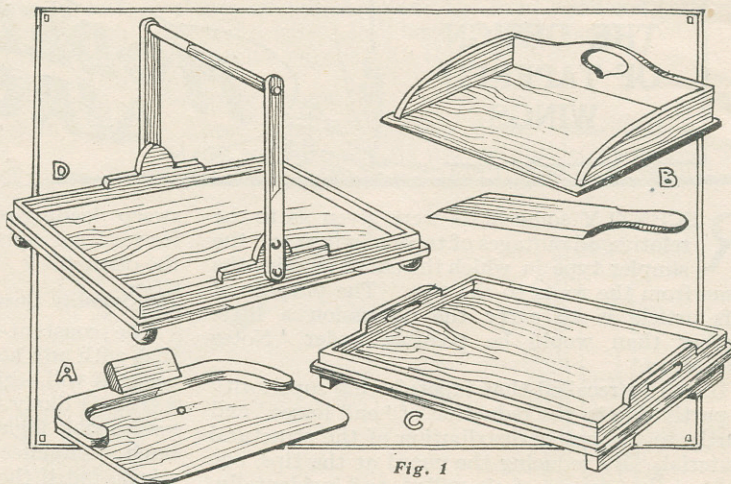


Fig. 1

chamfered edge planed down. The suggested size (C Fig. 1) is 16½ ins. by 10½ ins. The long sides are plain strips 16 ins. long by ¾ in. by ¾ in. thick with the top edges rounded off and glasspapered.

The Handle

To these the shorter handle sections will be either mitred or butted, the latter making the simplest and perhaps the cleanest job.

The width of the handle pieces should be about 1½ ins. to 2 ins., with slots cut in to form finger grips for carrying purposes. All four sides of the tray should be set in ¼ in. from the edge, and the feet afterwards glued on, with a couple of screws put through each to make secure.

The feet consist of two plain strips 10 ins. long by ¾ in. by ¾ in. hollowed in the middle with the fretsaw as shown.

Another Tray

The tray at D, Fig. 1 is similar but has shaped sides cut to the outline given in Fig. 5. To these sides are fixed upright handle pieces about 8 ins. long and ¾ in. by ¾ in. in section. The handle might be of ¾ in. dowel rod with small discs of ½ in. wood glued over to make a neat finish. Four large ball feet are added.

If readers desire help in marking out the shaped sections, the Editor will send a full size tracing ready for transferring to the wood if 1½ d. stamp is sent to cover postage.

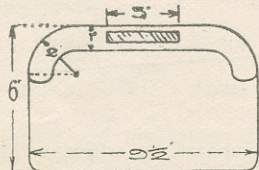


Fig. 2—Crumb tray shape

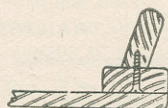


Fig. 3—Section of Fig. 4—The crumb scoop

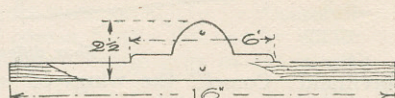
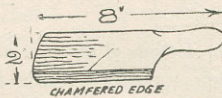
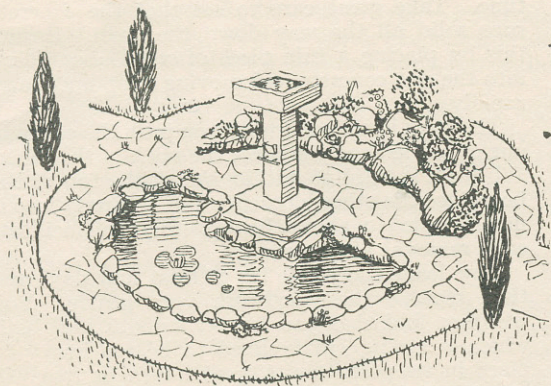


Fig. 5—The shape sides to tray D

Another of our interesting Photographic
Articles will be given in next week's issue

A BIRD BATH IN CEMENT



ALITTLE time and a little patience, coupled with six simple materials are all that are required to make an artificial stone bird bath for your garden. At a cost of only a few shillings the merest amateur can construct a garden ornament that would show credit to any authorised maker.

The materials required are 3 stone of cement, 2 cwt. of fine road slag (obtainable from any builder's merchant), 14 ft. of matchboarding, (failing which the side of a glass crate will make a substitute), 22ins. of $\frac{3}{4}$ in. iron gaspipe and "backplate," 1 porcelain seed box suitable for hanging and 18ins. of stout galvanised wire.

Construction

To commence the actual construction we must, naturally, start with the base shown in Fig. 1. Cut off four pieces of matchboarding 4ins. wide and nail them into a square with 18ins. sides. Two nails at each corner will suffice to hold it firm enough for the purpose required.

Now take away $\frac{1}{2}$ stone of the cement, for use afterwards, and mix the remainder, while still dry, very thoroughly together with the road slag. It

is most important that this mixing should go through all the material, for as soon as water is applied all mixing ceases and you may find that some parts appear all cement while others are just wet road slag which will never set.

Put aside four shovelful of the mixture and add water in the usual manner turning the concrete, as it is now called, over and over again to make it thoroughly tacky. It is of the required softness when it just settles slowly when placed in a heap.

Lay out a sheet of brown paper on a level surface; place over this the constructed framework and draw diagonal lines from each corner. This will give the exact centre where the lines cross each other.

On this point place the backplate, which is an iron plate with a flat bottom and a thread at the top.

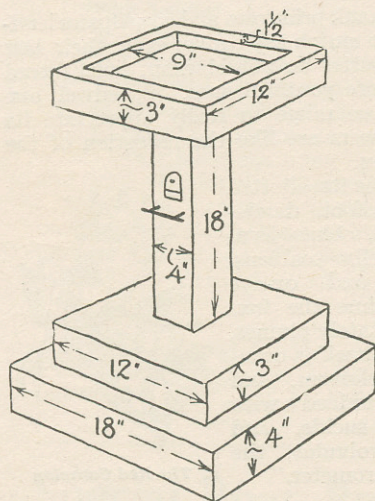
The Centre Pipe

Grease the iron gaspipe, which must have an easy running thread at one end, very thoroughly and screw lightly into the backplate. It will now stand upright as in Fig. 2.

Wet the wood and the iron and tip in the concrete. You will find that after the mixing there is only three shovelful of it. This will just be the right quantity. Pat the concrete down firmly with the edge of a piece of wood which is bounced up and down lightly as it is drawn across the square.

Leave in the open for 24 hours, but if constructed indoors the time to be left should be doubled. When the period has elapsed gently ease away one side of the woodwork, the remainder can then be "sprung" off and will leave a solid block of concrete.

Now, with this same woodwork make a 12in. rectangle, but this time only 3ins. deep. Repeat as before, but this time lay the brown paper on the newly formed block. Grease the rod afresh and wet the woodwork. Three shovelful of the dry concrete will be found ample to fill this block.



Details and dimensions

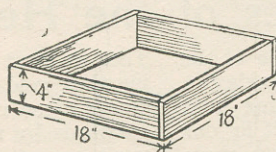


Fig. 1—The base framework

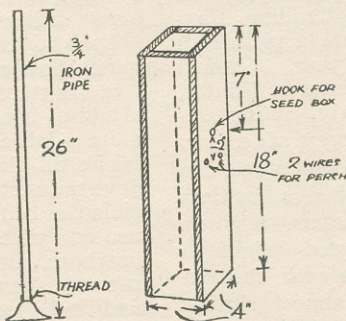


Fig. 2—The centre rod

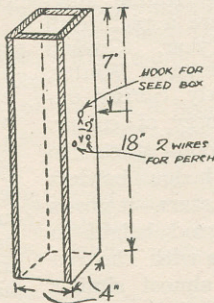


Fig. 3—Frame for pillar

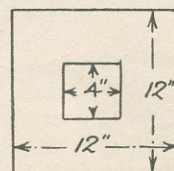


Fig. 4—The under top

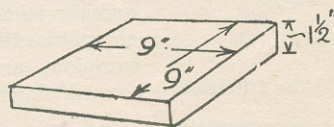


Fig. 5—The top block

While you are waiting for time to elapse for the setting of this you may proceed with the making of the box for the construction of the column as in Fig. 3.

The diagram will explain itself. Care must, however, be taken to nail in the middle of the length or the weight of wet concrete will be inclined to cause a "belly" and the shape will be spoiled.

A Seed Box on Side

The desire for a seed box is purely optional, but it greatly enhances the appearance. Cut your wire into three lengths. One of 4ins. and two of 7ins. Make a hole 7ins. from the top of the box just large enough to force the wire through. Put the 4in. piece through this until 1½ins. protrudes inside. This is to hang the seed box on.

Two inches below this and ½in. from either side make two more holes, and insert the remaining wire as before. These are to make a perch without which the seed box is useless. If the wire ends are bent inside the column they will be unable to be accidentally jerked out once the concrete has set.

When the smaller base has quite set, take away the woodwork and remake for the top which will be the same size. Cut the remaining short pieces to make the underneath side of the top (see Fig. 4). The square in the centre must be the same size as the square in the column box. Nail thoroughly underneath the top. Now nail round the edges of the inside square on to the column box, taking care that it is set on an even keel.

Fixing

Now, after greasing the rod once more and wetting the wood, fill up with concrete, which should have been made almost "runny" this

time. Take great care to see that the concrete runs solid all the way down the stem. Ensure this by placing a thin piece of wood about 6ins. into the wet concrete and moving it up and down rapidly.

The stem is not solid until you push the concrete out of one side as you force the stick in the other. When all is filled to within 1in. of the top of the box place the other block (see Fig. 5) firmly into it until it rests ½in. above the top. This will facilitate easy removal afterwards.

Now leave the whole for at least four days and then remove the woodwork very gently. You will now find that you have a smooth bird bath which is strong but inclined to be too heavy to place in its position. A gentle turn or two will bring to light the fact that each of the three sections will come apart, but this will in no way be detrimental to its strength.

Smooth or Rough

For those who prefer a smooth finish it only remains to fasten the seed box on the top wire and complete the perch with the aid of the two bottom wires and a short length of garden cane.

To give the bath a more artistic effect, however, one will need the remainder of the cement. Leave off the seed box and perch and place the bath in its desired position. Bury half of the large base in the ground and erect the remainder.

Mix half the quantity of remaining cement until it is of the consistency of soft butter. Wet the bird bath and put on the cement by a dabbing process with a stiff brush. Leave for two days and then repeat the process.

Both the smooth and the rough varieties will take about a month to lose their cement colour and take on the appearance of natural white stone.

NATURE NOTES.

The Glories of the Hedgerows

"YOUR wonderful hedgerows are one of the glories of your English countryside" a lady from California once said to me "and the greens—we never see anything like it in our country. Our green's more like grey." Undoubtedly the fringes of our "rolling English roads" are a picture all times of the year. Ground ivy patterns them in Winter, but from early Spring onwards is an orgy of colour. Stitchwort soon starts to lighten the hedge borders with its white stars—it grows quickly to a good height in companionship with the red campion, an almost similar shaped flower of deep pink.



The Stitchwort

Then we must thank primroses and cowslips for lending their gold to enrich the banks, even their last year's green rosettes do not blacken, until forced outwards by more youthful ones. Speedwell one must see at close range to really appreciate its beauty—its flowers are like the reflection of the bluest of heavens.

Each flower has its allotted span, yellow coltsfoot, dandelion, buttercup, blue hyacinth, harebell, scabious, white daisies and ox-eye daisies till the time the fox-glove raises its stately plumes, while the hedge itself is ornamented with blossom, and hawthorn, intertwined with fragrant honey-suckle, and bindweed, convolvulus, the "Poor Man's Barometer."



The Red Campion

The EDITOR'S NOTES



THIS week we have a real Special Number for you with double-sized design sheet, increased number of pages and a wider variety of articles than ever. You will vote it a wonderful fourpennyworth, I know, because no other book can offer you even half as much. Not the least popular will be, I know, the Cup Final Game and the new Picture Puzzle Competition. I am offering an Air Machine in the latter, and I want every reader to try and win it. There is nothing really hard, and it must be interesting because I found George in a corner trying to work out the advance copy which had just come to hand.

* * *

I HOPE, too, every air-minded reader—and they are many—will make up our "Comet" Monoplane. It has been specially designed for me by an expert who reports that the model, when tested showed a remarkably quick take-off, with a steep climbing angle. One big advantage, too, is that when its power is exhausted it flattens out without stalling. The final glide is very flat and the model almost always lands upright (an unusual quality you will agree!) even in bad weather. Tried out on a damp afternoon the average duration was 50 to 60 seconds. This is not solely a duration model of course, but it could very well be made one by eliminating some of the parts and using different prop and power. Altogether a real practical little piece of work, made much more easy by the large size blue print which is available.

* * *

NEXT week, too, is another simple novelty in connection with the Boat Race. Everyone will be following it very intently on the wireless, and I am offering a simple means by which you can enjoy it still more. No work or worry involved, but a helpful and straightforward gadget.

* * *

THERE is no doubt that once you start using fretwork tools, the fascination of them "gets you" and I find more and more interest from readers in all directions. For instance Edwin George of Toronto, Canada writes to me—"A few weeks ago, I bought a 'Crown' Fretwork Outfit with the definite intention of making but one article. Having cut the series of 'Gem' designs for practice, I have found the

work so absorbingly interesting that I have already added some four extra tools to the set and intend adding more in an attempt to increase my income." For pleasure combined with profit there is undoubtedly nothing to equal it. Even George, the pet office boy, who usually prefers doing nothing, agrees with this point of view.

* * *

A NOTE, too, I wrote recently concerned the question of specializing on one job in preference to spreading your work and ability over a wider range of pastime. The controversy has produced much interest and I must admit there is much to be said for both sides. My biggest fear against always doing the same type is that one may get "stale" and become uninterested. That seems a great pity when there is such a variety which can be undertaken from these pages.

* * *

I WAS perhaps forcibly reminded of this by seeing a show at Chester a little time ago of a model Fair Ground. It was undoubtedly a splendid piece of work with the Roundabouts, Racer, Noah's Ark and even Tractor all working away merrily from their electric current. Their builder had completed them in his spare time, and Mr. W. Kent of Saltney—who is the gentleman concerned—is certainly to be congratulated on his wonderful effort.

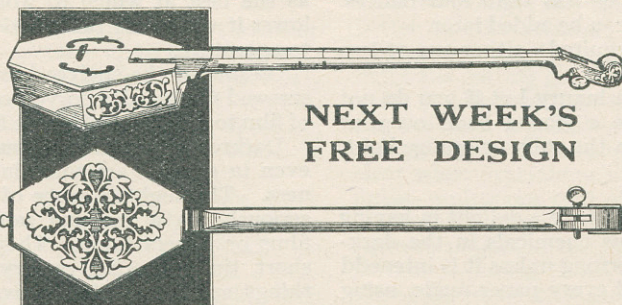
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BUT when I learned that it had occupied him for five years, I could not help wondering if such a specialised job was really worth it, or whether such a lot more could have been done in the same period if a little change had been allowed in the pastimes undertaken.

* * *

IT is, of course, a matter of individual concern, character and inclination. But I do strongly recommend a reader to think over the point before he undertakes anything which is likely to tie him up to a job for a very long time or who

begins to erect or plan a monumental job which may tire him or "feed him up" before he has struggled through to the end. Which is one of the reasons we have such a variety of designs provided on the gift sheet in Hobbies.



The Editor



MAKING A DARKROOM

(Part 2)

HAVING arranged a suitable room in attic or under the stairs as shown in our last article, let us turn our attention to lighting.

The best and safest is undoubtedly electric but it is not always possible to have it, and many may have to fall back on lamps. If electric is possible it is a simple matter to fit a complete lighting equipment with ruby, orange and white bulbs and the right position for the light is in the corner next to the wall and above the bench. The three colours are red for developing films or plates, orange for gaslight and bromide papers and the white for exposing the papers.

It is possible to purchase for a few shillings dark-room lamps which have the three colours as separate glasses so that the user can change them to suit the work which he has in hand. For panchromatic films a green safelight must be employed.

Ventilation

This has always been a difficult problem in small darkrooms and for those of you who have to make use of the stair cupboard it is even more difficult. For obviously you must not start making air-holes in the wood work and you should therefore refrain from putting any covering over the floor which might prevent a current of air coming through.

When working in such a room you must take every opportunity to open the door for a further supply of fresh air. The outdoor room however is rather easier to accommodate. Fresh air should come in at the floor and be driven out at the roof, but there must be no light coming in with it or showing where it goes out. It is necessary, therefore, to construct a form of box ventilator at both places, explanation of which is given in the illustration.

Apparatus for equipping and making the dark-room efficient depends on how much work it is intended to do. Two dishes are a necessity, a third is very useful and a fourth is a luxury. A glass measure must be included and for practical purposes it should not be less than four ounces. Smaller and larger ones can be added later.

Printing frames are required—either one or two at first.

A darkroom clock is a luxury but if you do not have it, you must have a second hand on your watch which is visible in the ruby or orange light.

Chemicals

Some amateurs seem to take a delight in having several bottles of various chemicals in the dark-room, but really this is wrong unless it is intended to try every process and every paper made, using the formula given by the maker.

Years ago it used to be considered the right thing to do to make up a solution according to the directions given on the leaflet enclosed with the paper. In some instances this may still be advisable but so much research work has been done with developers that it is possible to do all the developing with one developer such as Azol.

Certainly this is all that is required for films and plates and, if desired, it can be supplemented with a few packets of Johnson's Metol-Quinol, which is put out in 3d. packets and can be used for all makes of gaslight or bromide papers.

Apart from these the only other chemical that should have a place on the shelf is a tin of acid-fixing powder for fixing both films and papers.

Care of the Darkroom

If you were to visit one of the darkrooms of any of the large sensitised material manufacturers you would possibly be very surprised to find it so spotlessly clean. Everything is in order, dishes which are not in use are in racks, measures are standing upside down after being cleansed and the benches are kept free from chemical solution.

Take care to maintain cleanliness and you will save yourself many stains on prints and negatives. Do not weigh your chemical requirements in the darkroom but go into another place to do it. For, with some, the grains are so small that they may fly about the room and eventually settle on some of the material and leave spots.

If your bench is made of wood, cover it with a piece of linoleum or American cloth, to enable you to wipe it down with a wet duster when you have finished work. Never leave solutions in dishes or measures and be particularly careful to wash these pieces of apparatus after use.

A thermometer is a valuable accessory in any darkroom. If the temperature is below 65° you will be well advised to place some heating apparatus there for a few minutes. Otherwise you might spoil some good work.

All your solutions should register 65° at the time of using. This is a standard which is recognised as the best at which to work and if the room is lower it will cause the solution to fall to the same temperature.

On one of the shelves have two or three hooks screwed to the edge so you can suspend the spools of film to dry after you have finished washing them.

Darkrooms which are built in the garden or even in garages are sometimes inclined to dampness. The slightest trace of this must be treated seriously as a warning not to leave negatives, films or papers there. They will spoil in a very short time; so find a dry cupboard for these things and keep all negatives properly filed and stored.

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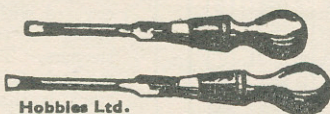
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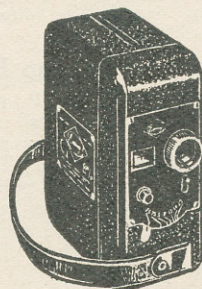
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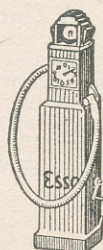
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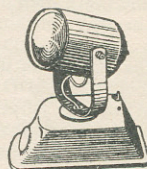
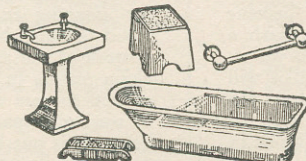
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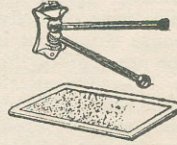


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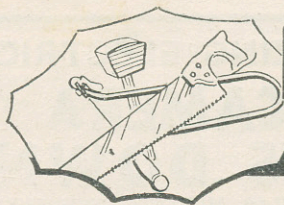
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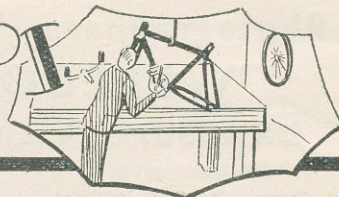


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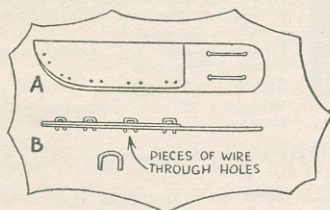
WORTH KNOWING



For original Tips published the sender will receive a Hobbies Handy Propelling Pencil. We cannot acknowledge all those received, or guarantee to print them. Send to The Editor, Hobbies Weekly, Dereham, Norfolk. Keep them short and add rough pencil sketches if possible.

Knife Holder

A GOOD way of sewing a leather sheath for a Scout knife is to punch small holes right down the side of the sheath which is to



be sewn, as A. Next take a length of copper wire and cut into small lengths and bend as at B. Push them through the holes and bend the ends over neatly. If a sheath is sewn in this way the knife blade can do no damage to the stitches.—(D.S.)

Cheap Duplicating Composition

OBTAIN a flat tin tray (6d.) which will hold the largest size print you desire to make. Purchase at the grocer's, three or four 1½d. LEMON JELLIES. Do NOT get the more expensive jellies, as these are not nearly so satisfactory. Break up the jellies, and place them in the tray. Warm the tray containing the jelly over a gas ring, moving it about all the time until the jellies are melted. ADD NO WATER. While the jelly is still liquid add ONE TABLESPOONFUL of GLYCERINE. Stir well and allow to set. Write your copy in the ordinary way with hectograph ink and allow to dry for about half an hour. When you have written the copy, and while it is drying, wipe over the set jelly with a sponge dipped in cold water. Do not put the copy on the jelly until the moisture has disappeared from the jelly. Print in the usual manner. If the prints become faint, wipe the jelly over with a sponge wrung out in cold water. The next two or three copies will be blurred, but after that the prints will be plain once more. To clean, wash with sponge dipped in HOT WATER.—(M.R.C.)

Cheap Polishing Pads

CHEAP powder puffs that ladies use make excellent insides for pads used for french polishing. The puff is soaked with the polish and covered with a piece of calico, on which a few drops of raw linseed oil are placed. The pad is then ready for work.—(M.S.P.)

Joining Celluloid

JOINTS can be made almost immediately by brushing the broken surface with slight concentrated citric acid. This can be

Crossword Solution

Here is the correct solution to the "Stamp" Crossword in last week's issue.

T	W	E	E	Z	E	R	S	D	A
A		V	I	O	L	E	T	U	S
	N	E	R	O		W	A	S	P
	O	N	E		S	A	M	P	L
G	I		H	A	R	P	I	S	
U	N		A	D	S		C		
M	U	G		R	T		P	A	W
				B	I		A	L	T
G	I	B	B	O	N	S		A	E
	D		U	P	E	N		L	
W	A	T	E	R	M	A	R	K	

made by removing the water from vinegar by distilling. Hold the edges together for a moment until adhesion has been made.—(A. Mc.M.)

Chain Cleaning

TO ensure its long life, your cycle chain should occasionally be taken off and cleaned. An old frying pan makes a fine receptacle for cleaning in. Two strips of wood should be placed in the bottom of the pan to prevent the chain resting in the dirt that will collect there. The chain should be washed in paraffin and re-oiled before it is put back on the cycle.—(K.H.)

Colour Cubes

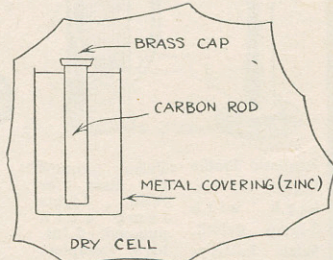
WHEN using watercolour paints, and no colouring matter comes off from the cube of paint when in use, apply a little vaseline or glycerine and rub it gently on the surface of the paint. Leave for a few days, and paint in cube is once again as good as ever.—(T. J.)

Ballast for Model Railways

QUITE realistic ballast can be made for laying in-between model railway tracks in the following way. Obtain some clean corks and cut or slice them up with a sharp knife or razor blade into small pieces. Next mix some paste in an old tin or saucer and completely submerge the cut-up pieces of cork until they are completely covered with paste. The paste should be mixed almost as thick as cream, and then the cork when covered with paste is easier to place in position. When the pieces of cork are completely covered with the paste, lay it all along the track, in between the sleepers. The advantage of this method of ballasting railway track is that there are no loose pieces to be picked up by the rolling stock, in case of a derailment.—(G. H.)

A Zinc Element

IN the article "A Battery set for lighting and charging" a zinc element is required. This metal is not easily acquired.



However, if you have an old wireless battery break it up and you will find it is composed of numerous little metal covered cells. This metal is zinc and one battery should make you six if not more cells.—(J.C.P.)

HANDBOOKS WHICH HELP YOU

The New Model Aeroplane Manual. By L. H. SPAREY and C. A. RIPPON. "The best book on Aero Models which I have ever read." A. P. Thurston, D.Sc., says. 84 pages. 223 illustrations. Price 3s. 0d.; post free 3s. 4d.

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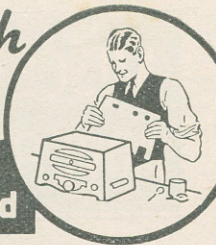
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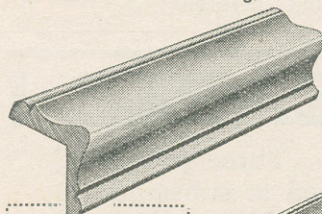
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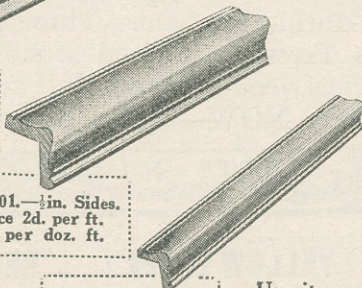
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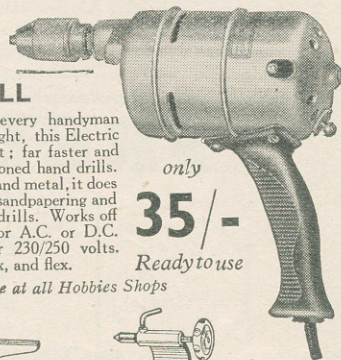
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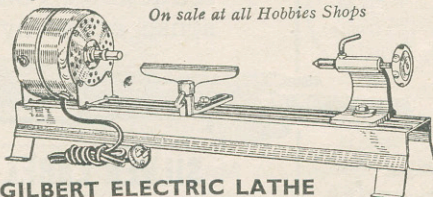
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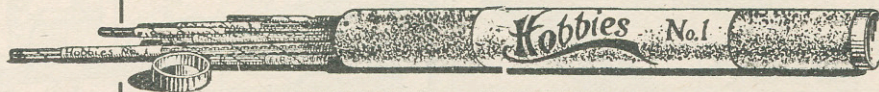
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HOBBIES SALE

STAMP COLLECTOR'S CORNER

LAKES ON STAMPS

THE first illustration is of a peculiar lake: though possibly one of the most valuable in the world it is shown on the 6 c. of the 1935 Trinidad and Tobago. The title is "Discovery of Lake Asphalt 1595." This lake is about 100 acres in extent, which may not convey much to those who live in a town. Suppose we say that on its surface no less than seventy football pitches could be marked out.

That is only given as an indication of size, because actually although the edge of the lake is solid enough, the centre is viscous or oily. So some players would have a sticky pitch!

The depth varies and in some places is as much as twenty feet. The surface is irregular, being marked by gas cavities. It is possibly news to some that there is another pitch lake in Venezuela which is much larger than the Trinidad lake. It is about 1,000 acres in extent.

Since we have written about an unusual lake we may as well mention an unusual source of another. Look at the 1½d. value of the current New Zealand stamps. There you will see a Maori woman dipping food into a boiling spring.

It is said that it is possible to catch a trout in a stream and then by just turning around, but without moving away, to boil the fish

1d. of the 1898 and the 4d. of the 1900 issues.

The long 2½d. value of 1898 shows Lake Wakatipu and Mt. Earnslaw. You may have a specimen of this which shows the name of the lake as Wakatipu, because at one time the stamp was so issued. You should certainly look for both specimens. Then the 3d., 4d., and 7d. air mails of 1931 show Lake Manapouri.

If you look on a map of West Africa and find Lake Chad, you will probably notice that the area round the small blue mark which indicates the lake is dotted. The reason for this is that the size of the lake varies very much according to the time of the year.

During the dry period it is something like 6,000 square miles, but if it rains heavily then the area is about six times as much! Naturally when reading this you will realise that the area around is very marshy and consequently very well stocked with waterfowl.

The picture of this is shown on the higher values of the postage dues of the Tchad stamps—sometimes the lake is spelt with the T in front.

Another African lake is shown as an illustration here—Lake Victoria. This lake is the source of the river Nile, and is some 4,000 feet up, the water leaving the lake by the Ripon Falls.

Speke discovered the lake in

The third illustration—that of the 2 centavos of Bolivia 1916 issue—shows Lake Titicaca which is 12,800 feet up in the Andes—the highest lake in the world. The 1930 air stamps of the same country show another view of this lake with a steamer upon it.

Since the lake is 4,000 square miles in extent one can understand steamers being used, but what a height they have to be taken up. They are not built on the lake shore, but taken up in pieces and put together up there!

Since the largest and best known lakes in the world are situated in North America one would certainly expect to find reference to them on the stamps of the United States of America. More especially since that country seems to go in for pictorial stamps.

Yet one has to search for reference to any one of the five great lakes and then you are only rewarded by such specimens the "Ship canal locks at Saulte St. Marie" on the 8c. of the 1901 issue.

Lake Placid is mentioned, but this is a small lake in the east where the Olympic Games (winter sports) were held. Crater Lake appears on the National Parks issue 6 c. of 1934. As the name indicates this lake is in the crater of a volcano, extinct, of course. This crater is six miles in diameter



A Lake of Pitch

without taking it off the hook on which it was caught.

Well, that may be possible, but most readers will doubtless prefer to clean the fish before cooking it, anyhow.

New Zealand has given us one or two quite pretty lake scenes. The most common is Lake Taupo and Mt. Ruapehu, shown on the

Lake Victoria

1858 during the reign of Queen Victoria, hence the name.

The same design is used for the 50c. of the 1935 issue, and on the 30 c. and 5/- of the same issue may be seen the Jinja bridge which is by the Ripon Falls. The 1/- and the 3/- of this issue show Lake Naivasha. This lake is 2,000 feet higher than Victoria.

Lake Titicaca

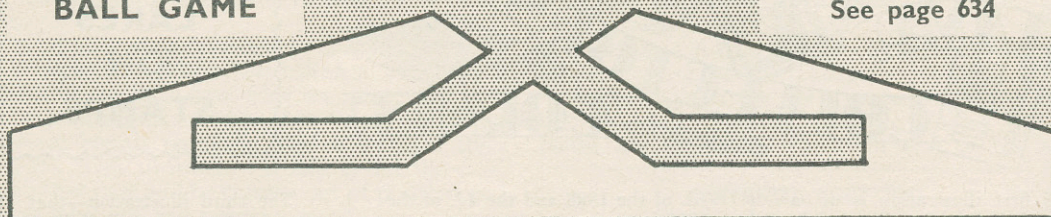
and as would be expected it is quite deep and well over a mile above sea level.

The fourth illustration is the nearest reference to the great lakes—the 3 c. Wisconsin Tercentenary 1934. It shows Father Nicolet landing on the shores of Green Bay on the north west shore of Lake Michigan.

Part of Lake Michigan

BALL GAME

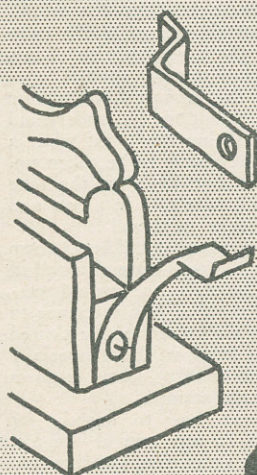
See page 634



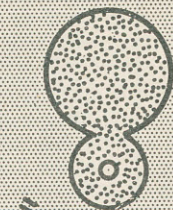
BALL RUNWAY — CUT

ONE FROM $\frac{1}{4}$ " PLYWOOD.

DETAILS OF SPRING.



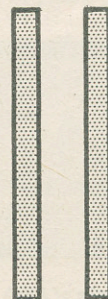
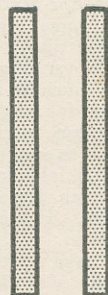
WORDING.



$\frac{1}{8}$ "



OUTLET COVERS.



BASE

$\frac{1}{4}$ "

RING.



BACK.

CUT ONE FROM

$\frac{1}{8}$ " PLYWOOD.

(SEE ARTICLE)

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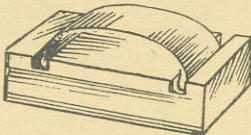
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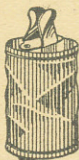
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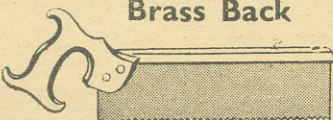
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P/O. No. Value

Name

Gifts! Gifts! Gifts!

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**Sale ends
April 2nd**



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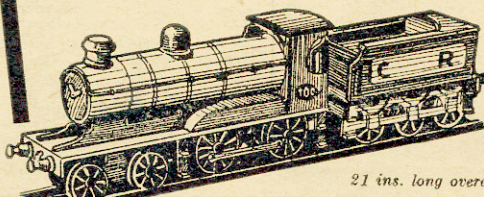
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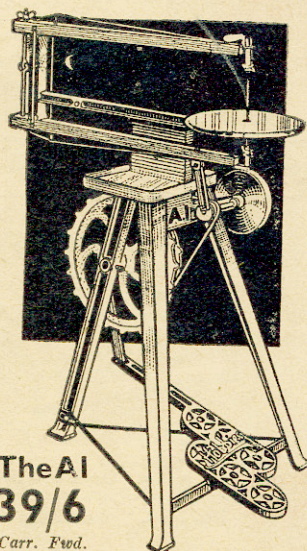
MODEL LOCOMOTIVE



21 ins. long overall

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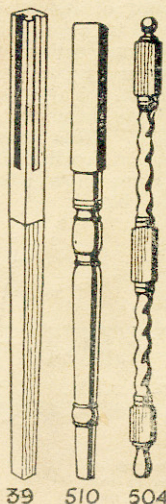
**The Al
39/6**

Carr. Fwd.

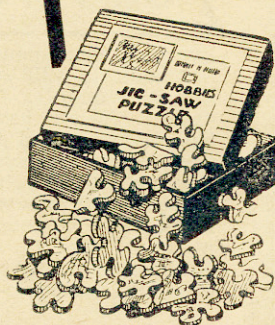
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